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AMERICAN JOURNAL OF OPHTHALMOLOGY
VOLUME 18 JANUARY, 1935 NUMBER 1

ADVANCEMENT OF THE SUPERIOR OBLIQUE AND INFERIOR OBLIQUE OCULAR MUSCLES

JOHN M. WHEELER, M.D.
NEW YORK

Two operative procedures are described by which the hitherto unmolested oblique ocular muscles can be reinserted according to the requirements of the abnormality. Torsion, depression, and abduction function can be increased or decreased as necessary. The operation on the superior oblique may be used for excessive elevation in adduction, and either advancement or recession of the superior rectus can be done conveniently along with advancement of the superior oblique.

The operation on the inferior oblique is especially useful in depression of the globe accompanying ptosis and may in such cases be combined with advancement of the superior rectus. From the Institute of Ophthalmology, Columbia Presbyterian Medical Center. Read before the American Ophthalmological Society at Lucerne-in-Quebec, Canada, July, 1934.

In discussing surgery of the ocular muscles, Alfred Graefe[1] said that operation on the oblique muscles constituted a "Noli me tangere." Koster[2] thought that theoretically it might be possible for one to shorten the tendon of the superior oblique, despite the fact that the field of operation is accessible only with difficulty, but in the case of the fleshy and short inferior oblique a shortening of the muscle was out of the question.

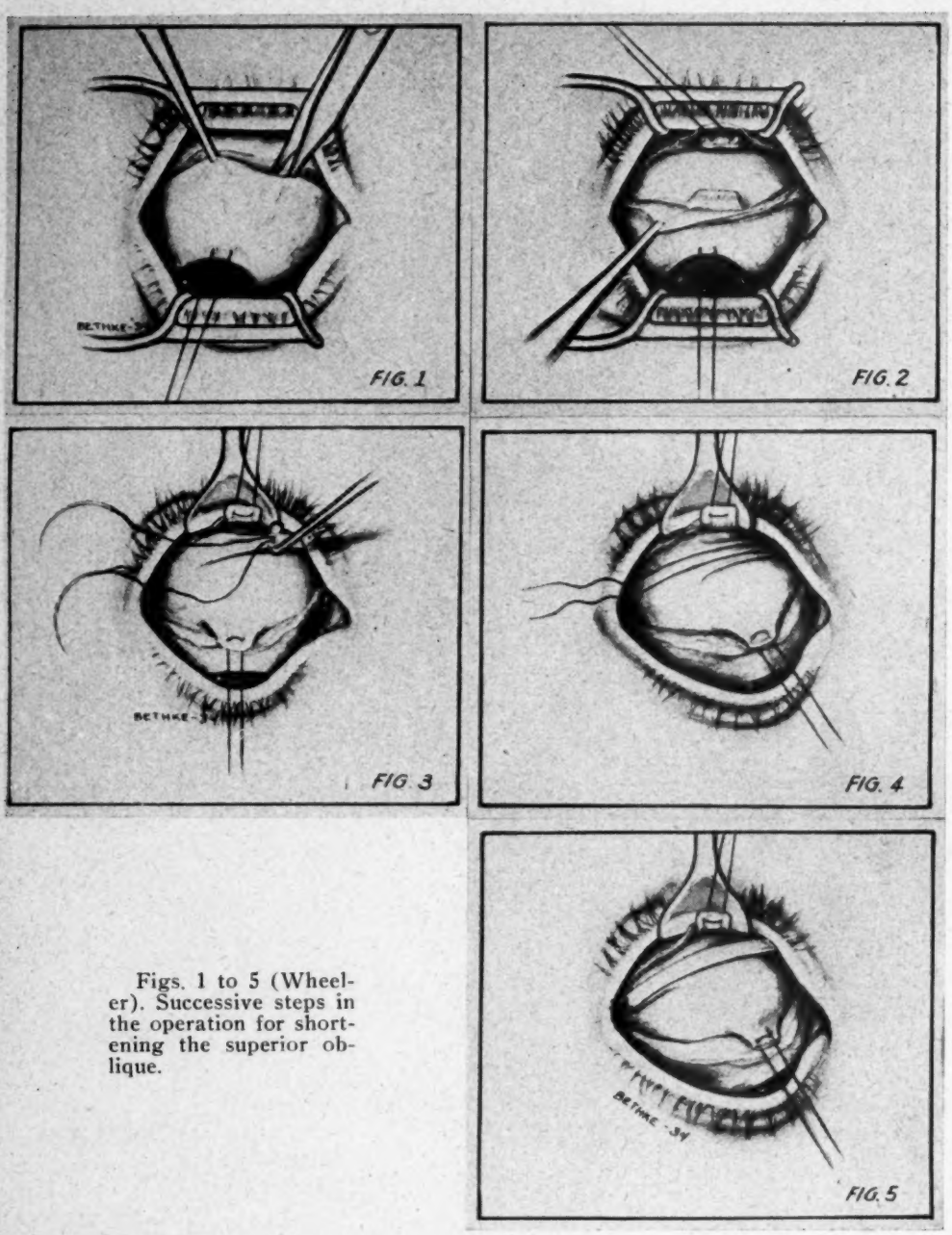
Banister[3], in discussing "Surgical Suggestions as to Individual Paralysis of the Oblique Ocular Muscles," said, "Owing to the anatomical relations of the superior and inferior oblique muscles to the eyeball, their deep location in the orbit, and their attachments to the globe in the neighborhood of the equator, any special procedure of a surgical character directed to the paralyzed obliques themselves, in the nature of an advancement or shortening by tucking, is out of the question. In attempting to relieve the distressing diplopia in such instances of paralysis the ophthalmic surgeon must make use of other muscles, the recti."

In 1903, Jackson[4] wrote on "Operation on the Tendon of the Superior Rectus Muscle for Paresis of the Superior Oblique." He suggested outward displacement of the insertion of the superior-rectus tendon by severing it near its insertion and sewing it to the sclera in a more temporal position. The operation increased the power of the muscle to produce intorsion and increased the power of cooperating with the inferior oblique to assist in turning the eye outward.

The feasibility of surgical shortening of the superior oblique has been demonstrated in five cases, in four of which I was the operator, and in one Arthur E. Sherman, chief resident of the Institute of Ophthalmology of Presbyterian Hospital, New York City.

Operation for shortening the superior oblique

General anesthesia is administered. The eye is turned well down by means of a suture attached to the sclera just above the cornea (fig. 1). The conjunctiva is incised in the upper fornix and dissected so as to expose the insertion of the superior rectus. A suture is passed through the superior-rectus tendon near its insertion and the tendon is cut between the suture and the insertion. The superior rectus is then allowed to retract (fig. 2), and is separated from the underlying superior oblique tendon. A squint hook is slipped



Figs. 1 to 5 (Wheeler). Successive steps in the operation for shortening the superior oblique.

under the rather frail superior oblique and a double-needled suture of fine gut or silk is made to loop the middle third of the tendon several millimeters from the insertion (fig. 3). The needles are then carried into the superficial sclera temporalward from the original insertion (fig. 4). During the maneuver, the eye should be held extremely downward and inward. When the double-needled suture is tied, the superior oblique is advanced in an amount to correspond to the distance from the points of entry of the needles in the tendon to the points of entry into the sclera (fig. 5). It does not matter whether the

tendon is cut off near the original insertion or not. There seems to be no advantage in cutting the tendon. After the superior oblique is made fast to the sclera, the superior rectus is sutured back in place, and the conjunctival wound is closed with fine silk.

Comments: Rules for the *amount* of *advancement* called for cannot be given, but one can say that considerable immediate overcorrection is necessary.

The *kind of effect* can be regulated. For example, if a torsion effect is desired, the new insertion should be farther forward than the original insertion. If accentuation of usual function is desired, the original axis of the tendon from pulley to insertion should be preserved. If little torsion effect, but considerable depression and abduction function is desired, the new insertion should be carried backward.

Figure 6 illustrates *torsion correction.* Extorsion before operation was an important feature of the case, the first in which I operated. The insertion was carried forward as well as temporally, and by undeserved good luck the torsion defect was almost exactly corrected.

Figure 7 shows little effect on torsion, and considerable on depression. In this case, the original direction of the tendon was preserved in the advancement. The different plottings show the need for overcorrection.

A striking feature of our results was the *check action of the advancement* which manifested itself in attempts at elevation of the globe in adduction (fig. 7). This suggested the *feasibility of using the operation for excessive elevation in adduction,* the condition seen so commonly and referred to as spasm of the inferior oblique. So, in the case operated on by Doctor Sherman, advancement of the superior oblique was performed (along with resection of the external rectus and tenotomy of the internus) instead of tenotomy of the inferior oblique for upshoot in adduction. Figures 8 and 9 show photographs of the patient before and after operation.

Either advancement or recession of the superior rectus can be done conveniently along with advancement of the superior oblique, as the necessary dissection of the superior rectus is practically made as an incident to the superior-oblique operation. If the superior rectus is dissected free well back, narrowing or widening of the palpebral fissure need not be feared.

It cannot be said that the operation is convenient nor easy, but technically it is entirely possible and reasonable.

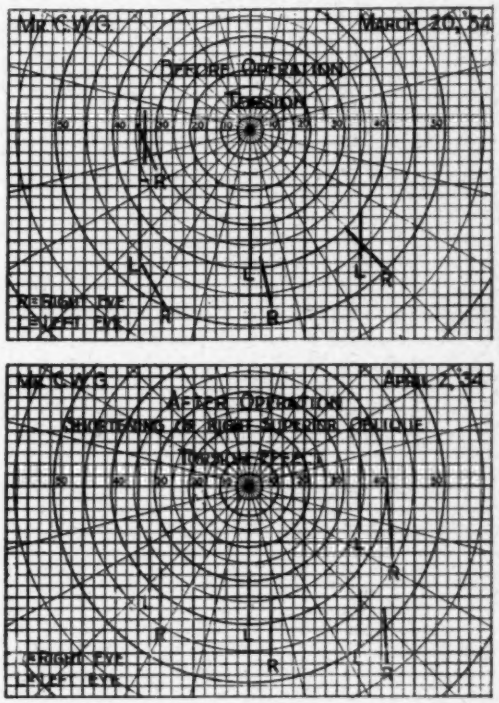


Fig. 6 (Wheeler). Correction of torsion.

Operation for shortening the inferior oblique

Either infiltration or general anesthesia.

On several occasions during a number of years, I have attempted shortening the inferior oblique by tucking the muscle behind its anterior attachment, and sometimes I have attached the tuck to the periosteum at the orbital margin, and the results have been disappointing in some instances. The technic here presented is satisfactory.

A skin incision about two centimeters long is made along the orbital margin with the anterior attachment of the inferior oblique at about its center. The dissection is carried through the tarsoorbital fascia into the orbit and the in-

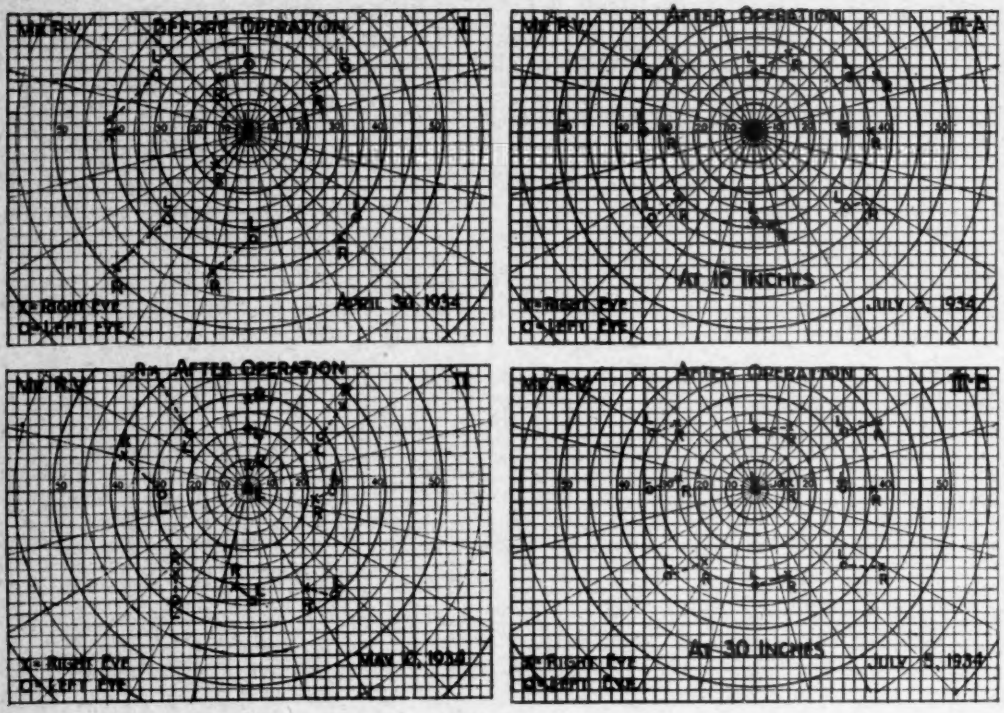


Fig. 7 (Wheeler). Little effect on torsion, but considerable depression. Plottings show the need for overcorrection.

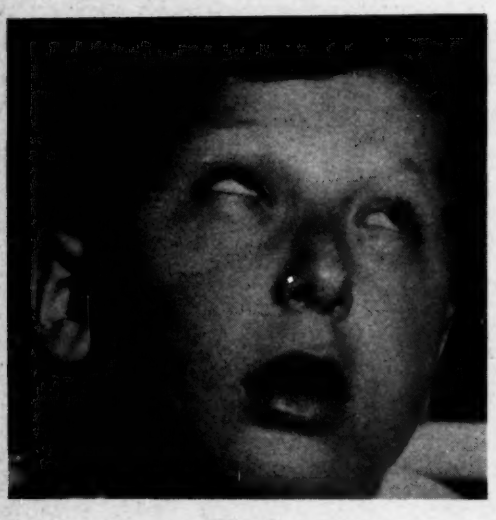


Fig. 8

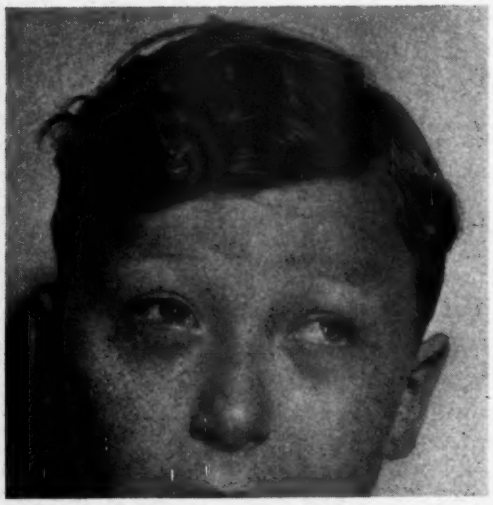


Fig. 9

Figs. 8 and 9 (Wheeler). The patient before and after operation, in which advancement of the superior oblique was performed, resection of the external rectus, and tenotomy.

ferior oblique is exposed. The dissection is carried also downward for exposure of the periosteum a centimeter or more below the orbital margin. Two fine chromic-gut sutures are passed through the tendon near its anterior attachment, while the muscle is held on a squint hook (fig. 10). The tendon is cut free at its attachment and carried over the orbital margin. It is advanced as much as need be and secured to the periosteum on the facial surface of the superior maxillary bone by means of the gut sutures (000) as shown in figure 11. The skin wound is then closed with fine silk sutures.

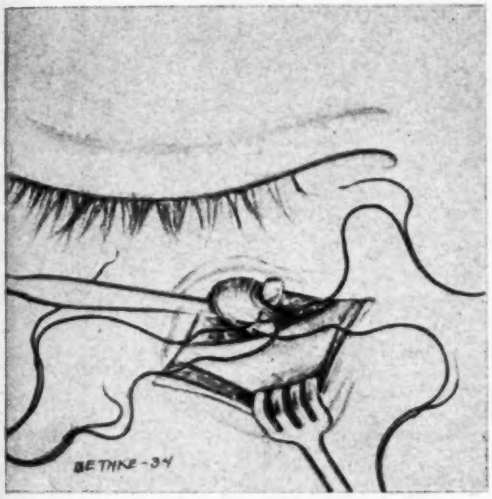


Fig. 10

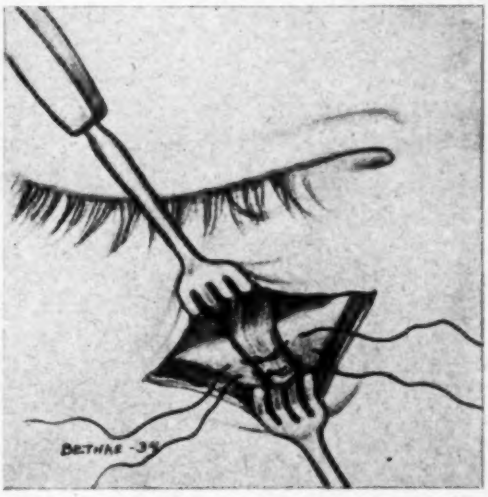


Fig. 11

Figs. 10 and 11 (Wheeler). Operation for shortening the inferior oblique.

Comments: It is well to leave a little tissue attached to the periosteum below the orbital margin when the dissection is made, as the periosteum is less apt to tear when the needles carry the fine gut through to secure the tendon.

I have found this operation especially useful in depression of the globe accompanying ptosis, and in such cases it may be combined with advancement of the superior rectus. Later the Motais type of operation can be done the more readily on account of the increase of available substance of the superior rectus on exposure.

Advancement of the inferior oblique by the method described is satisfactory and rather easy of performance.

635 West One hundred sixty-fifth Street.

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THE OCCURRENCE OF CILIARY PROCESSES ON THE IRIS

ALGERNON B. REESE, M.D.
NEW YORK CITY

The author reports that it is not uncommon to find one or all of the ciliary processes on the iris instead of on the ciliary body. In such instances, the process is covered by a double layer of pigment epithelium around its base. There is usually a bridge between the iris processes and the contiguous process on the corona ciliaris. Under the bridge there may be a recess, which in the cross section has the appearance of a cyst in the iris stroma. Such processes, by interrupting the dilator-muscle layer of the iris, may give the latter a congenital irregularity; their excision may incite undue reaction, and may be an exciting cause of sympathetic inflammation. From the Department of Ophthalmology, Columbia University. Read before the American Ophthalmological Society, at Lucerne-in-Quebec, Canada, July, 1934.

The object of this paper is to present the embryology, frequency, histology, and possible clinical significance of a somewhat common congenital anomaly of the eye; namely, that in which ciliary processes arise from the posterior surface of the iris instead of from their normal site on the corona ciliaris.

Embryology. From the sixth to the beginning of the ninth month of intrauterine life, the anlagen of the ciliary processes are seen mostly on the posterior surface of the iris (fig. 1). In the course of development there occurs a shifting of the position of these anlagen toward the site they occupy in the fully developed eye. Even in the newborn some of the ciliary processes are com-

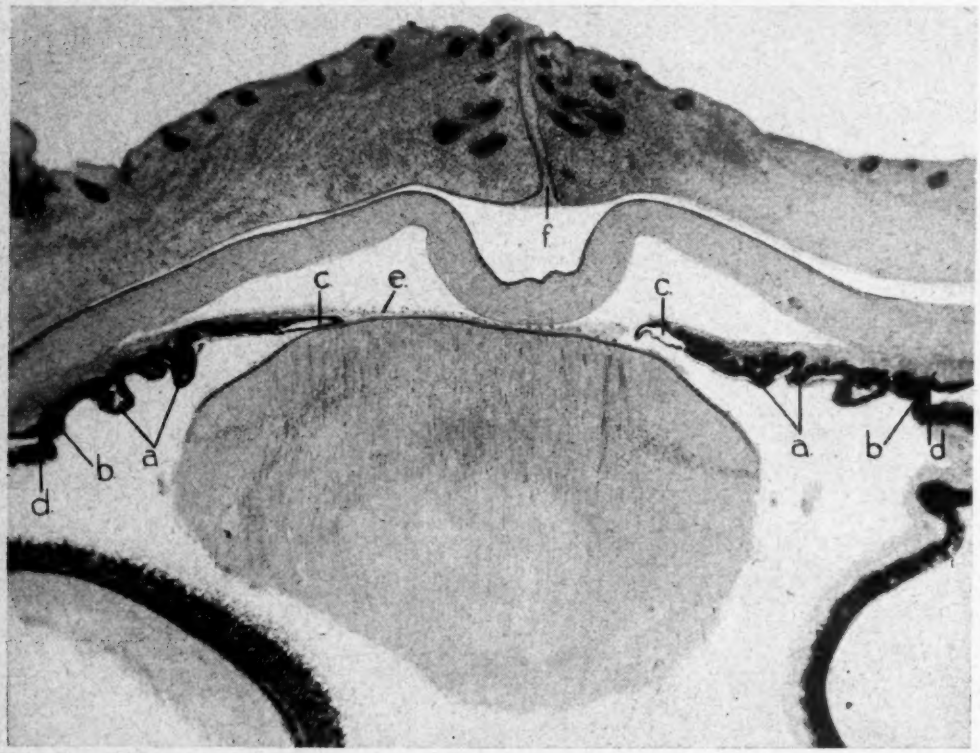

Fig. 1 (Reese). The anterior portion of a human fetal eye of six months: a, the anlagen of the ciliary processes on the posterior surface of the anlage of the iris; b, the anlage of the ciliary body; c, the ring sinus of Szily; d, the termination of the retina; e, the pupillary membrane; f, the lid cleft.

monly seen on the iris (Eisler[1], Gallenga[2], Axenfeld[3], Lauber[4], Wolfrum[5], and it is not until after birth that normally all of the ciliary processes either reach their final position (Lauber) or vanish from the iris (Wolfrum, Eisler). Some observers (Eisler, Lauber) have stated that budlike prominences, representing rudimentary ciliary processes, sometimes remain on the iris in the adult eye.

Frequency. It is surprising that no mention has been made of the fact that in the adult human-eye one or all of the fully developed ciliary processes may arise from the posterior surface of the iris instead of from their usual site on the corona ciliaris. This congenital developmental anomaly is not at all an infrequent finding in the routine examination of globes. Its frequency, however, is appreciated only when the entire globe is cut completely in serial sections. Of eight otherwise normal human eyes so sectioned, ciliary processes in six were found to arise from the iris, and this report is based on the findings in these six cases—these six together with those of other cases encountered accidentally in the routine examination of globes.

Histology. The histology of a ciliary process arising from the iris differs from that of one arising from the ciliary body in that the former is covered by a double layer of pigment epithelium around its base (fig. 2). The external epithelial layer loses its pigment gradually as it approaches the apex where the epithelial covering is similar to that of a ciliary process (fig. 2). At the base of a process arising from the iris, the dilator-muscle layer is interrupted (fig. 2). These changes in the epithelial layers are more readily understood by recalling the course of the layers from the ciliary body to the iris. The ciliary body and its processes are covered by two layers of epithelium; i.e., a nonpigmented epithelial layer (the extension of the retinal layer) resting on one of pigmented epithelium. The former is continued on the posterior surface of the iris as the pigmented epithelial layer, and the latter is continued as the dilator-muscle layer of the iris. Thus the double layer of pigmented epithelium covering the base of the processes arising from the iris represents the transition of these two layers from their characteristics in the iris back again to their characteristics in the ciliary process. The stroma and vascular bed of the iris

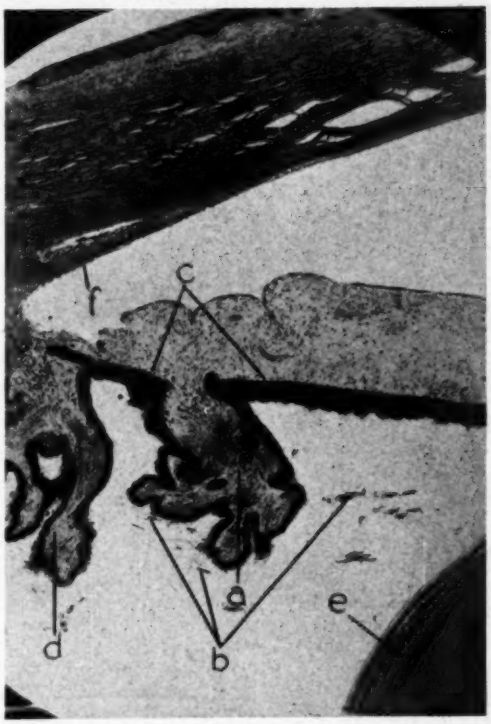

Fig. 2 (Reese). A human eye enucleated for sarcoma of the choroid. The section is through the pupillary area: a, an isolated ciliary process on the iris showing a double layer of pigment epithelium covering its base and towards the apex a layer of nonpigmented epithelium resting on a layer of pigmented epithelium, which is the arrangement seen normally in ciliary processes; b, zonules coursing over and from the process; cc, the dilator-muscle layer which is interrupted over the base of the process; d, ciliary processes arising from the corona ciliaris; e, the lens; f, the pectinate ligament and Schlemm's canal.

processes appear to be the same as those of the ciliary processes. In addition the iris processes give off zonular fibers (fig. 2).

The processes on the iris may be isolated and have no connection with the ciliary processes, but generally a bridge exists between the iris processes and a contiguous process of the corona cili-

Fig. 3 (Reese). Three serial sections through the region of an iris process in an otherwise normal human eye enucleated because of an orbital tumor. These show the recess often formed under the bridge connecting an iris process to a ciliary process.

A. The iris process, a, with no connection to the ciliary processes, b.

B. An adjacent section which shows the bridge, c, between the iris process, a, and the ciliary body, b; d, is the recess under the bridge.

C. A still further section to show the apex of the recess, d.

aris. Under this bridge there is usually a recess which, in an individual cross section, has the appearance of a cyst in the iris stroma. This is shown in figure three which gives three serial sections "a," "b" and "c" through the region of an "iris" process in an otherwise normal human eye enucleated because of orbital tumor. Tertsch[6] claims that spontaneous cysts of the iris arise from

such areas but apparently his report is based on random sections. Complete serial sections through the apparent cyst probably would have shown it to be a cross section of a recess under a bridge connecting a ciliary and an iris process. This is all the more probable because Tertsch was of the opinion that these apparent cysts were formed in the embryo by a union of ciliary processes which had persisted on the posterior surface of the iris.

The number of processes arising from the iris may vary from one (fig. 2) to all (fig. 4) and there is evidently no meridian of the eye for which this anomaly has a predilection.

In the eyes of certain animals, notably rabbits, and, to a less extent, sheep, goats, etc., the majority of ciliary processes normally arises from the posterior surface of the iris.

Clinical Significance. The only possible suggestions in regard to the clinical significance of this anomaly are as follows:

1. These processes, by their interruption of the dilator-muscle layer of the iris, may cause a congenital irregularity of the pupil.

2. Their excision, in operations on the periphery of the iris, may incite undue reaction.

3. Their excision, especially in instances where all the ciliary processes are on the iris, may possibly be an exciting cause of sympathetic inflammation.

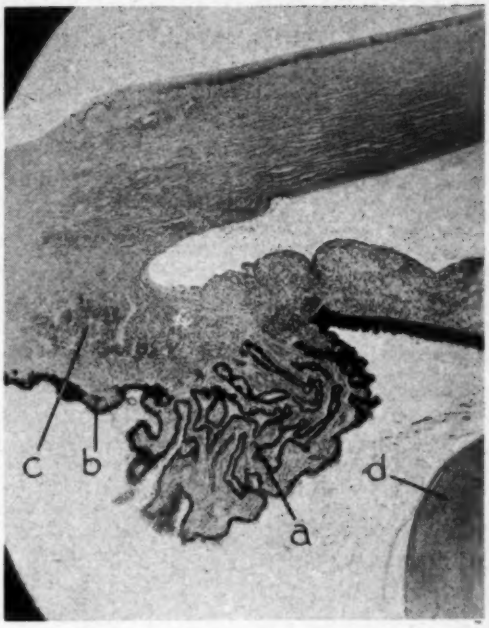

Fig. 4 (Reese). A human eye enucleated for sarcoma of the choroid: a, the entire mass of ciliary processes on the iris; b, the corona ciliaries with only a rudimentary process arising from it; c, the circular smooth-muscle bundles cut in cross-section; d, the lens.

73 East Seventy-first Street

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Acknowledgment is accorded Mr. N. C. Ross for the photography and technical work.

STUDIES ON THE INFECTIVITY OF TRACHOMA

II. On the Relation of Human and Simian Folliculosis to the Infection Induced by Trachomatous Tissue in Monkeys

L. A. JULIANELLE, PH.D. AND R. W. HARRISON, PH.D.
SAINT LOUIS

In order to determine whether the conjunctival infection observed in monkeys following the transfer of trachomatous material is specific of trachoma, a number of experiments were made. Tissues obtained from human folliculosis and inoculated in monkeys by a similar technic failed in any instance to provoke the formation of follicles. It was later shown, however, that the animals used in these experiments were capable of infection following inoculation of trachomatous tissues.

Attempts to induce follicles nonspecifically were made with several chemicals, as well as with tissues from different conjunctivitides. In no instance were follicles observed in the animals inoculated. Unfortunately, it was not possible to test the effect of tissues derived from other eye conditions, other than trachoma, characterized by inclusions.

That the experimental infection is not an extension of latent or frank folliculosis of monkeys was also demonstrated by a series of experiments. From the bacteriological laboratories of the Oscar Johnson Institute, Washington University School of Medicine, Saint Louis, Missouri. The entire work was conducted under a grant from the Commonwealth Fund of New York City.

The observations reported[1] upon in a previous communication indicate that conjunctival material derived from human trachoma induces a follicular infection when transferred to the conjunctiva of *M. rhesus*. It was stated at that time that the follicles eventually regress without evidence of cicatrization and that the cornea never becomes involved. It is obvious, therefore, that the experimental disease in monkeys lacks the two predominant complications of clinical trachoma and in these respects it coincides more closely with the folliculosis commonly seen in school children. The problem increases in complexity by the occasional occurrence of spontaneous folliculosis in monkeys, a condition which in appearance is not unlike the experimental infection. Furthermore, attempts to differentiate the various follicular reactions by histological methods have been unconvincing, due to similar changes in all of them, so that, on the basis of clinical evidence alone, the possibility must be professed that the experimental disease in monkeys may not be trachoma.

In order to determine the specific and precise character of the experimental infection in monkeys, this study was begun, and sufficient evidence has been provided to indicate that the follicle induced in monkeys by the inoculation of trachomatous material is not only specific, but actually constitutes the counterpart of human trachoma.

Experimental

In planning the experiments for the present study, emphasis was laid to a great extent upon the transmissibility of human folliculosis to monkeys. The patients were supplied by Dr. C. E. Rice of Rolla, Missouri, from Missouri and Arkansas, and by Dr. Lawrence T. Post, from the Washington University Clinic. In each case the material consisted of scrapings and expressed follicular contents obtained by grattage under novocaine anesthesia. This was subsequently inoculated in monkeys either by swabbing or subconjunctival injection. As far as was possible the experimental procedures were in parallel with those employed in the study of trachomatous tissues. Animals were then observed routinely for six weeks before it was concluded that the conjunctiva was unaffected by the inoculation. Scrapings from all patients were examined for epithelial cell "inclusions." Later, similar experiments were conducted with cultures from various sources to be described below.

1. Transmissibility of human folliculosis to monkeys. The results following conjunctival inoculation of monkeys with material from human folliculosis are summarized in table 1. An

analysis of the data reveals that a total of 14 tissues was studied by inoculating 18 monkeys. Except for one animal, which was swabbed with the human material in both eyes, all the animals were inoculated by swabbing the conjunctiva of the left eye and by subconjunctival injection of the right eye. Scrapings from the conjunctiva of all the patients studied were found to be lacking in "inclusion" bodies. This has been pointed out by a number of observers, and in fact the presence of "inclusions" in doubtful early trachoma is utilized as a factor of differential diagnosis between the two conditions.

Table 1

TRANSMISSIBILITY OF HUMAN FOLLICULOSIS TO MONKEYS

Material	Presence of "Inclusions"	Number of Monkeys Inoculated	Method of Inoculation	Result of Inoculation	Result of Later Injection with Trachomatous Material	Interval Between Injections
No. 1	none present	1	O.S.—Swab O.D.—Injection	Negative	Infected	2½ months
No. 2	none present	1	O.S. —Swab O.D.—Injection	Negative	Infected	2½ months
No. 3	none present	1	O.S. —Swab O.D.—Injection	Negative	Died before tested	—
No. 4	none present	1	O.S. —Swab O.D.—Injection	Negative	Died before tested	—
No. 5	none present	1	O.S. —Swab O.D.—Injection	Negative	Died before tested	—
No. 6	none present	2	O.S. —Swab O.D.—Injection	Negative	Both infected	6 months
No. 7	none present	2	O.S. —Swab O.D.—Injection	Negative	Both infected	3 months
No. 8	none present	1	O.U.—Swab	Negative	Not tested	—
No. 9	none present	2	O.S. —Swab O.D.—Injection	Negative	Not tested	—
No. 10	none present	2	O.S. —Swab O.D.—Injection	Negative	One infected One not infected	3½ months
No. 12	none present	2	O.S. —Swab O.D.—Injection	Negative	Infected	5 months
No. 13	none present	1	O.S. —Swab O.D.—Injection	Negative	Infected	5 months
No. 14	none present	1	O.S. —Swab O.D.—Injection	Negative	Not infected	3 months

O.S. indicates left eye; O.D. right eye; O.U. both eyes.

Of the 18 animals inoculated as described, none showed any effect other than mild, transient hyperemia and injection of the conjunctiva. This disappeared within 48 to 72 hours. The everted lids were examined carefully at regular intervals for six weeks with a hand slitlamp. At no time during the period of observation were follicles ever seen in any of the animals. The indications are, therefore, that human folliculosis is not infectious for monkeys and cannot be established in these animals. In order to render the evidence more conclusive, however, 11 of the 18 animals receiving follicular tissues were subsequently inoculated with material from human trachoma. The interval between the injections of follicular and trachomatous tissues varied from 2½ to 6 months, depending upon the availability of satisfactory patients. Of the 11 animals inoculated with material from trachoma, nine were infected successfully, thus eliminating from further consideration the possibility that the lack of reactivity to inoculations of follicular tissues might be due to a high, natural resistance to infection. The conclusion seems unavoidable, therefore, that material derived by grattage from human folliculosis is not infectious for the conjunctiva of *M. rhesus*. In other words, trachoma and folliculosis of man

are distinguishable in that the one is infectious for monkeys while the other is not.

2. The effect of irritation on spontaneous follicles of monkeys. The possibility has been suggested by certain workers[2] that the follicles which appear in monkeys subsequent to inoculation with trachomatous tissue represent an exacerbation of the potential or latent folliculosis which occurs spontaneously in these animals. Olitsky, Syverton, and Tyler[3], indeed, have been able to isolate from a certain variety of this disease a heretofore undescribed organism which they named Bact. simiae and which they later showed was capable of inducing spontaneous folliculosis in these animals. While monkeys with frank follicles have always been rejected in the experiments on infectivity of trachomatous tissues, a study was nevertheless made of the spread of naturally occurring follicles by artificial methods as a corollary to the study of the infectivity of human folliculosis.

Accordingly, monkeys with varying numbers of spontaneous follicles and those with no follicles observable by hand-slitlamp examination, were studied. The conjunctivae of these animals were irritated by a variety of methods over varying periods of time, but in no instance was there ever an extension of follicles already existing, or a formation of new follicles. In another experiment, natural follicles were punctured with a sterile cataract knife and the escaping fluid was smeared over the surface of the conjunctiva. Even this procedure was not followed by the appearance of new follicles. That animals with several follicles have no increased resistance to infection by trachomatous tissue was demonstrated at a later date when it was possible to infect such monkeys by inoculation with active trachomatous material.

The conclusion appears reasonable therefore that the infection which occurs subsequent to the introduction of trachomatous tissue conjunctivally, is not the result of inciting some agent previously existing in a quiescent state in the conjunctiva*.

3. The response of the conjunctiva of monkeys to bacteria isolated from various conditions of the eye. Certain authors[4] have considered the follicles of trachoma to be the result of nonspecific infection. Since the follicle represents essentially a lymphatic hypertrophy of the conjunctiva, it might therefore be considered as a response to some irritation aggravated by infection. Experiments were devised to determine the effect of continuous low-grade irritation as furnished by infection.

The cultures used in these experiments were isolated in great part from trachomatous lesions, and to a less extent from folliculosis and chronic conjunctivitides. Young cultures in broth or in semisolid leptospira media were inoculated by swabbing, subconjunctival injection, or by both methods. Some of the cultures were inoculated only once, in other instances at different intervals repeated over varying periods of time. A large variety of cultures was studied including staphylococci, streptococci, pneumococci, diphtheroids, and a number of unclassified gram-negative rods. Twenty such experiments were performed employing seventy-odd animals, some of which received inoculations of individual strains while others received cultures pooled to approximate the proportion in which they were originally isolated. The latter procedure was used particularly with organisms cultured from trachoma and as in the above experiments, the animals were examined routinely for six weeks. In no instance were the bacteria referred to above capable of inducing the formation of follicles. If, therefore, the follicle is the result of nonspecific infection or a lymphatic hypertrophy due to the irritation of chronic infection, then the cultures employed were not the proper "nonspecific" organisms and the irritation accompanying their inoculation was not an adequate stimulus for inducing follicles.

* For the complete and more detailed experiments on the possibility of artificially stimulating follicles in monkeys, attention is called to a recent report by one of the present authors (Harrison, R. W., Jour. Inf. Dis., in press).

Discussion

Because the experimental infection which occurs in monkeys following conjunctival inoculation with trachomatous material lacks certain clinical complications of human trachoma, the possibility was considered that the experimental disease is not the counterpart of the human disease. The complications lacking are notably cicatrization and degenerative changes in the cornea, typified by clouding and vascularization. It is true that with these differences it is difficult to distinguish the experimental infection from diseases clinically similar but etiologically different from trachoma. In the present report experiments have been described which indicate that the experimental disease is indeed transmitted specifically by trachomatous material.

In order to eliminate human folliculosis as a factor in the experimental infection, material from the human condition was introduced conjunctivally in monkeys by swabbing and by injection. The inoculations had no effect on the animals, thus rendering the decision unlikely that human folliculosis is infectious for monkeys. It was further shown that monkeys which did not react to follicular material were susceptible to infection by trachomatous material.

That the experimental infection in monkeys does not represent an extension of latent, spontaneous follicles is amply indicated by the failure of numerous attempts to create spreading. Even rupture of follicles with spreading of the contents over the conjunctiva did not cause an increase in the number of follicles. Yet these animals were later infected with tissue from patients with trachoma.

Further experiments were conducted to establish a low-grade infection with a wide variety of bacteria isolated for the most part from trachoma. The experiments were varied in numerous details, but the results were quite definite in demonstrating the inability of prolonged, subacute, "nonspecific" infection to induce the formation of follicles. The conditions of the experiments were so arranged as to effect an irritation, possibly capable of inducing lymphatic hypertrophy, but without success.

Table 2

A COMPARISON OF HUMAN TRACHOMA, HUMAN FOLLICULOSIS AND EXPERIMENTAL "TRACHOMA"

Disease	Occurrence of "Inclusions"	Histological Changes	Infectivity	Incubation Period	Presence of Follicles	Presence of Scarring	Corneal Reaction	Immunity
Human Trachoma	Present	Similar	Present	1–4 weeks	Present	Present	Present	Absent
Experimental "Trachoma"	Absent	Similar	Present	1–4 weeks	Present	Absent	Absent	Absent
Human Folliculosis	Absent	Similar	Absent	—	Present	Absent	Absent	—

It seems obvious, therefore, that the present study fails to support the concept that the experimental infection of monkeys following introduction of trachomatous tissue represents either the transfer of human folliculosis, or the extension of latent folliculosis of monkeys, or the result of "nonspecific" infection.

Experience in the study of other human diseases also illustrates the general difficulty in reproducing the exact picture of human infections in experimental animals. Since trachoma is a human disease of exquisite specialization, it does not seem surprising that its experimental counterpart in monkeys should show certain clinical differences from the natural disease. It is unfortunate that the experimental disease possesses certain similarities to other eye conditions, not trachoma; but the evidence presented indicates that

there are differences, not in clinical appearance but in nature, between human folliculosis, for example, and the experimental infection of monkeys. These differences are specified in table 2. It will be seen that while follicles are present in all three conditions and the histological changes are similar, trachoma differs from the other two by the presence of scarring and corneal reactivity. On the other hand, human trachoma and the experimental infection, not human folliculosis, are infectious and exhibit a comparable incubation period. Data are lacking so that no parallel analysis is included for spontaneous folliculosis of monkeys. This condition, however, is excluded as a factor in the experimental infection by the experiments reported above and by the isolation of Bact. simiae, which is not recoverable from human tissues. Furthermore, the follicles of the experimental infection are characterized by (1) uneven distribution, (2) great variation in size, and (3) marked vascularization—characteristics which are the antitheses of the follicles seen in spontaneous folliculosis.

It is desirable to determine the infectivity of other eye diseases which show epithelial inclusions and follicles, such as vernal catarrh, inclusion blennorrhea and swimming-bath conjunctivitis, but an inability to obtain patients with these diseases has made it impossible to pursue experiments of this nature.†

Summary and Conclusions

1. Human trachoma is transmissible to monkeys.

2. Human folliculosis is not transmissible to monkeys whose susceptibility to trachoma is subsequently demonstrable.

3. It was not possible to stimulate the formation of follicles by (a) nonspecific infection, (b) irritation, (c) spreading of the contents of naturally occurring follicles over the rest of the conjunctiva.

4. No opportunity was afforded for studying the infectivity of other eye diseases which manifest both follicles and "inclusion" bodies.

5. The evidence obtained in this study fails to confirm the opinion that the infection following inoculation of trachomatous tissue represents either human or simian folliculosis.

640 South Kingshighway.

† Since going to press the opportunity presented itself of inoculating monkeys with material from active inclusion blennorrhea. While no report of the experiment is attempted at the present time, it is desired to point out that the infection in monkeys following inoculation with material from inclusion blennorrhea is indistinguishable clinically from the infection induced with trachomatous tissue.

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AN ANOMALY OF THE CILIARY BODY ASSOCIATED WITH CONGENITAL CATARACT*

ROWLAND H. MERRILL, M.D.
NEW YORK CITY

The author describes an unusual anomaly of the ciliary body associated with a small, shrunken, congenital cataract. The ciliary processes were elongated and hypertrophied and were clearly visible when the pupil was dilated. The lens was dislocated upwards and outwards, drawing the ciliary processes along with it. The cataract was removed by operation without improving the vision although the fundus showed no lesions. The author discusses the probable etiology and reports a similar case from the literature.

Developmental anomalies of the ciliary body, although not uncommon, are sufficiently rare to be interesting. They are usually associated with other malformations of the eye, such as coloboma and microphthalmus.

Fuchs (1929)[1] reported a series of eight cases in which there was a posterior displacement of the ciliary processes. In seven instances there was luxation of the lens, and in the eighth there was an abnormally large lens. He attributed the anomalous development of the ciliary processes to a gradual sinking of the lens into the vitreous and a backward displacement of the ciliary processes due to traction. Two similar cases were reported by Zeeman (1925)[2] and Seefelder (1911)[3]. The ciliary anomalies in these cases were not discovered clinically, but were observed only incidentally on histological study of the excised eyes. Fuchs (1920)[4] also described a benign proliferation of the ciliary epithelium which must be classed as a malformation in the strict sense of the word.

Report of Case

An anomaly belonging in this general group, but differing in the clinical and etiological aspects, was recently observed at the Wilmer Ophthalmological Institute. The clinical picture was quite unusual.

W. R., a white male, twenty-three years of age, came to the Wilmer Dispensary on October 2, 1933, complaining of a cataract in the left eye. The family history was negative. The past history was negative except for the usual exanthemata of childhood. The present illness began shortly after birth, when his mother noticed a "white mass" in the left pupil. The patient was taken to an oculist who made a diagnosis of congenital cataract. Operation was not advised and had never been performed.

Examination: Externally the right eye was normal throughout. Slitlamp and ophthalmoscopic examinations were negative. Vision was 20/20 and the visual field normal for form and color.

L. E.—Externally: With the right eye fixing, the left eye deviated outwards about 5 degrees. There was slight lateral nystagmus, more pronounced on extreme adduction or abduction. This eye was somewhat smaller than the right, the cornea measuring 11 mm. in diameter compared with the 12-mm. diameter of the right eye. The upper lid drooped slightly. The range of ocular movements, the cornea, and the sclera appeared normal. Tension was normal to fingers. The iris was definitely lighter in color than that in the other eye. Occupying the pupillary space was a small, pearly-white cataractous lens encircled at the equator by a series of small, rodlike bodies which extended from behind the iris towards the periphery of the shrunken lens.

Slitlamp examination, with the pupil dilated, disclosed a beautiful picture. The cornea and anterior chamber were normal. The iris showed considerable atrophy and in spots was extremely thin, the normal markings being almost entirely obliterated. On the nasal side, near the pupillary border, delicate strands of iris tissue were separated from the main body of the iris, thus forming a series of small holes in the iris proper. From the pupillary margin,

* Prepared while the author was a member of the Staff of the Wilmer Ophthalmological Institute of the Johns Hopkins University and Hospital in Baltimore.

near "7 o'clock," a deeply pigmented band of tissue passed over to the lens, to which it was firmly attached by two small pigmented masses lying on the anterior lens capsule about a third of the way toward the center. This band was attached to the margin of the iris by several small, scantily pigmented fibers, which spread out fanlike to join the iris. Some of these fibers were quite similar to those seen in persistent pupillary membranes, but were pigmented and inserted medially to the circulus minor. The end of the band on the lens was quite dense, but nonpigmented. The lens was shrunken, apparently dislocated and glistening white in color. It occupied the temporal three fifths of the semidilated pupil (maximal dilatation could not be produced). Although the lens appeared to be dislocated temporally and slightly upward, its entire periphery could be seen by looking across from the nasal side underneath the temporal portion of the iris. It was shrunken both in diameter and thickness, and near its periphery was so thin that only the opaque capsule remained. Quite deep in the substance of the densely white lens was a network of blood vessels that appeared to be patent and that traversed the lens in all directions. A large vessel came forward to form a communication with the pigmented band, which stretched over from the pupillary margin of the iris. On the anterior surface of the lens was a small mass of white, amorphous-looking material, which seemed adherent to the lens, but was enclosed by the thickened and opaque capsule.

The abnormally developed ciliary processes were especially interesting. They encircled the shrunken lens posteriorly, projecting out varying distances behind the iris. Some reached the lens periphery, where they seemed buried in its substance, others stopped just short of the lens, while still others extended barely beyond the pupillary margin of the iris. They tapered gently from a rather blunt, clublike periphery to a somewhat smaller end. Some of them twisted slightly as they extended toward the lens and were somewhat thicker antero-posteriorly than laterally. A delicate system of blood vessels could be seen in each process, the vessels terminating just a little short of the distal end, although below, in a few of the processes intimately adherent to the lens, two fine vessels were seen to penetrate deeply into the lens substance. Between each two processes and extending from their sides and tips were numerous, delicate, translucent, zonular ligaments, which passed to the lens equator where they were inserted in the distorted lens capsule, some at the equator and others just in front of or behind it. These ligaments intimately bound the lens to the encircling processes. Examination of the slightly twisted processes revealed that the fibers arose from the posterior aspect of the ciliary processes. As seen from the illustrations, these processes completely surrounded the lens, although to see them on the temporal side, one was obliged to look obliquely between the lens and iris.

With the ophthalmoscope a faint red reflex could be obtained around the periphery of the lens, but no fundus details were made out.

The vision was 1/200. The visual field showed slight peripheral constriction and a fairly large nasal defect.

A general physical examination was negative except for chronic tonsillitis and dental caries. The blood chemistry, blood counts, and urinary examinations were normal. The Wassermann reaction was negative.

Treatment. The carious teeth were extracted and the tonsils and adenoids removed. Extraction of the cataract was done for cosmetic purposes. In view of the complicated nature of the cataract, with its firm attachments to the zonular ligaments and the ciliary processes, a preliminary iridectomy was first done.

The iridectomy was performed under local anesthesia on October 25, 1933. At operation, the iris was found securely bound to the hypertrophied ciliary processes and only with some difficulty could a portion of it be withdrawn for excision. It was nonelastic and gave the impression of being fibrous. The root of the iris was so adherent to the underlying tissues that the peripheral fibers could not be included in the iridectomy. The post-

operative course was uneventful and the patient was discharged on October 29, 1933.

Four weeks later he was readmitted for extraction of the lens (November 28). The incision was made with a Graefe knife, a broad conjunctival flap being made with the section. After breaking some of the zonular fibers with an iris hook the small shrunken cataract was grasped and withdrawn with toothed capsule forceps. A small amount of fluid vitreous escaped during this maneuver. Examined macroscopically, the lens was nothing more than a dense white membrane. Interestingly enough, the hypertrophied ciliary processes retracted immediately after removal of the lens, so that an unobstructed, clear, black pupil resulted. The tips of the processes could then be seen under the margin of the iris.

A moderately severe postoperative iridocyclitis developed after five or six days, which improved under treatment with hot compresses and atropine, and the patient was discharged from the hospital on December 14. The iridocyclitis became more marked, despite treatment continued in the Out-Patient Department, and the patient was readmitted to the hospital for nonspecific protein therapy. He was then given three intravenous injections of triple-typhoid vaccine at two-day intervals, the doses being forty, sixty, and seventy-five million organisms. Marked improvement followed and the patient was discharged. Thereafter the eye improved steadily until on the last examination, four months later, there was no irritation whatever. There were still a few tiny pigment granules on the posterior corneal surface, but the anterior chamber was clear.

The ciliary processes were no longer visible except on wide dilatation of the pupil. The fundus was clearly seen with a +6 lens and was entirely normal except for a small, white structure which projected into the vitreous from the disc, to which it was attached by rather dense strands which arose from the center of the physiological excavation. It was quite similar to the remnants of the hyaloid artery or a persistent Cloquet's canal. It moved slightly when the position of the eye was changed. The best vision was still only 1/200.

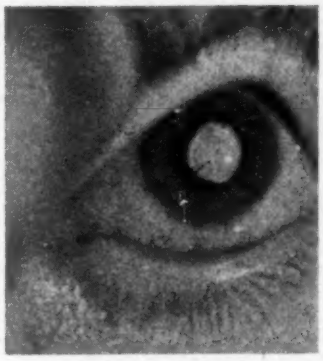

Fig. 1

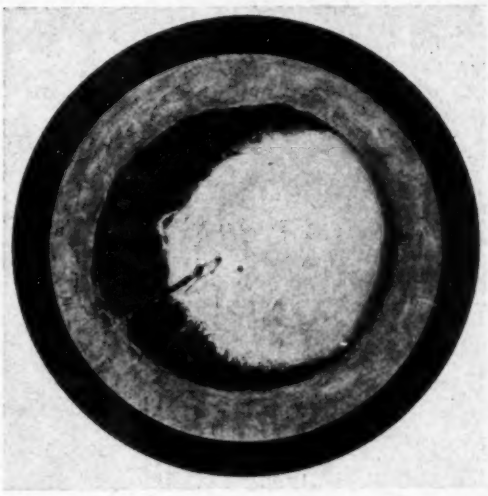

Fig. 2

Figs. 1 and 2 (Merrill). Clinical and slit-lamp aspects of the dislocated lens, showing the pigmented band from iris to lens and the hypertrophied ciliary processes extending behind the iris and, in individual instances, adhering to the lens.

Comment

In a search through the literature of the last thirty years only one similar case was found, and this differed in some respects from the present one. Luftman (1930)[5] described what he called a "cataracta rudimentaria" which occurred in an otherwise healthy male, eighteen years of age. The cornea was slightly smaller than its fellow, the eye deviated slightly up and out, and there was moderate nystagmus of the af-

fected eye on extreme movements. The small, shrunken cataract was associated with dislocation of the ciliary body. Some of the ciliary processes were drawn out toward the small lens from underneath the iris below. These processes appeared to come from far back in the vitreous chamber. The cataract was removed with deWecker scissors, as it could not be dislodged with forceps. Vision after operation was reported by Luftman as a questionable 6/36. The author considered his case as one due to traumatic cyclodialysis produced by a blunt injury in much the same manner as the well-known iridodialysis. The cataract he declared was the result of injury to the lens itself from the blow, or was secondary to nutritional disturbances associated with the cyclodialysis. He also considered the possibility of the condition's being due to a congenital ectopia lentis complicated by dislocation of the ciliary body.

Scheerer (1923)[6] described a case of membranous shrunken cataract with vascularization and quoted seven similar cases from the literature in one of which (Vossius's) the ciliary processes were visible. Other cases of elongation of the ciliary processes have been reported from examinations of enucleated eyes. Thus Czermak and Ulbrich (1907)[7] described a case of occlusio and seclusio pupillae, which on histological examination revealed elongated ciliary processes adherent to a fibrous mass which had replaced the lens. Leech (1930)[8] reported similar findings in an eye removed because of suspicion of glioma, but which on histological examination showed fetal uveitis with cataract and posterior fibrovascular sheath. A case reported by Fischer (1933)[9] is also of interest. His patient, a six-weeks-old infant, presented a congenital anomaly of the left eye involving the lens, ciliary body, iris, and vitreous. The ciliary processes were elongated by traction. The position was probably due to a fetal uveal inflammation. The cases of E. Fuchs, Seefelder, and Zeeman have been mentioned.

The present case is interesting as an unusual clinical picture as well as from the standpoint of the mechanism of its production. The illustrations give a good representation of the clinical appearance of this case. In only one of the references cited (Luftman's article) is there an illustration similar to those herewith produced.

To reconstruct the probable course of events which produced the picture reported here, it is only necessary to bear in mind the relations existing between the lens and the developing ciliary body during embryonic and fetal life. At about the sixth week, the lens lies with its equator in the pupil. The small space between the periphery of the lens and the optic cup is usually occupied by mesodermal cells and vessels representing the connection between the tunica vasculosa lentis posterior and the surrounding mesoderm. Occasionally the lens may rest directly on the margin of the pupil. As the eye grows, the lens ordinarily sinks back slightly in relation to the plane of the iris, but it is easily conceivable that adhesions between the lens and iris or ciliary body could become so dense as to persist. A fetal uveitis would favor the formation of such adhesions but is not essential to their causation. This case showed no K.P. deposits and nothing to indicate definitely an antecedent uveitis.

The relations between the lens, iris, and ciliary body in different stages of development are clearly pictured by Bach and Seefelder[10] in their atlas of the development of the human eye (1914). Plate XIV, figure 3 shows the embryonic lens, in an eye of thirty-four to forty days, in the space which later becomes the pupil. The lens is seen to be separated from the walls of the cup by only a few vessels and cells. Figure 2 on plate XXVIII, in a fetus of three months, shows the lens resting against the iris, and in figure 3 on plate XXIX, in a fetus of six months, the lens is in intimate contact with the iris and ciliary body.

In this case the normal development of the lens was altered by adherent ciliary processes from which blood vessels later penetrated into the lens substance. Over a course of months or years the lens became partly absorbed

and began to shrink, thus drawing out the adherent ciliary processes with it and causing them to proliferate and elongate. Even though all of the processes were not attached to the lens, a long-continued traction upon the zonular ligaments would suffice to produce this anomaly of the ciliary processes.

210 East Sixty-fourth Street.

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ACUTE DACRYADENITIS

F. Bruce Fralick, M.D.
ANN ARBOR, MICHIGAN

This paper deals with the precipitating factors in the development of an acute dacryadenitis together with its clinical course and sequela. The clinical appearance is well illustrated by the accompanying photographs. From the Department of Ophthalmology, University of Michigan.

Seldom is the practicing ophthalmologist called upon to treat conditions affecting the lacrimal gland. Consequently, little is written in the standard textbooks on the subject of acute inflammations of this structure. It is, therefore, conceivable that a few cases may leave our offices improperly diagnosed because of our unfamiliarity with this particular group.

The possible precipitating factors in the production of an acute dacryadenitis are extremely varied. Undoubtedly, one of the commonest causes is mumps, and the inflammation has been termed mumps of the lacrimal gland by various observers. Other evidences of a possible metastatic involvement have been reported in association with sepsis, gonorrhea, syphillis, tuberculosis, and the acute exanthematous diseases. True to our all too commonly overstressed theory of the dissemination of infection from one part of the body to another, foci of infection have been credited with causing acute dacryadenitis. Leukemia may induce simple swelling of the gland, due to leukemic infiltration, which may be associated with secondary inflammatory changes. Trauma is seldom a causative factor, due to the protection afforded the gland by the overhanging supraorbital ridge. The exogenous routes of involvement of the lacrimal gland are mainly ascending through the excretory ducts from conjunctival infections.

The reported cases all seem to run a rather typical course and conform to the findings of the observer. The condition starts with a mild pain in the lacrimal region and is followed in a few hours

by the rapid production of edema in the outer angle of the upper lid. The lid droops, due to the inflammatory swelling. For the first few days there may be only tearing, but later there will be considerable purulent discharge in the conjunctival sac, which appears to be coming from the upper cul-de-sac. On separating the lids, the conjunctiva is found to be hyperemic and markedly chemotic. In those cases in which the lid-droop is not too great, the patient complains of diplopia, and examination shows the eye to be convergent and depressed with limitation of abduction. Seldom is proptosis noted. The enlarged, tender lacrimal gland may be felt beneath the orbital rim and may easily be seen if there is not too much pain on everting the swollen lid. The gland may or may not suppurate. If it does suppurate, it may point and drain through the skin or through the conjunctiva. Suppuration of the gland is common, but Lebensohn found that the bilateral adenitis of mumps almost never suppurates. A review of the reported cases shows that the condition is usually unilateral but when associated with mumps is usually bilateral.

The intensity of the inflammatory symptoms is out of all proportion to the relative benignity of the affection or its attendant insignificant subjective symptoms. There may be slight elevation in temperature and preauricular adenitis.

Fig. 1 (Fralick). The left eye shows the swelling of the upper lid and its tendency to droop.

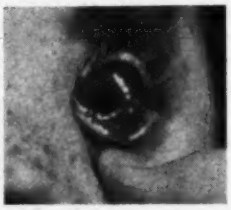

Fig. 2 (Fralick). The left eye with lids separated, showing the chemosis of the conjunctiva and the cornea turned down and in, due to the swelling of the lacrimal gland.

The process generally ends in resolution, either spontaneous suppuration and drainage or through incision and drainage of the suppurating gland. The more unusual sequela is the development of a chronic dacryadenitis, manifested by a swollen, tender lacrimal gland and an absence of tears.

An acute dacryadenitis is more commonly confused with an acute hordeolum at the outer angle, which may give a similar edema and drooping of the lid but does not produce the limitation of motion of the eye nor convergent squint. The tumescence is in the tarsal portion of the lid and not beneath the orbital rim, as in swellings of the gland. Orbital cellulitis, furuncle, purulent ophthalmia, and orbital periostitis are less easily confused with the condition under discussion.

The treatment consists of continuous iced compresses, if seen early, in an attempt to combat the developing edema. Once the process is full blown, hot compresses will hasten resolution. When suppuration develops, the gland may be incised either through the skin or better, if possible, through the conjunctiva. In those cases in which a chronic adenitis develops and does not respond to conservative treatment, simple enucleation of the gland will usually be indicated.

408 First National Bank Building.

LIQUID ADHESIVE FOR EYE DRESSINGS

MORIE FREDERICK WEYMANN, M.D.
LOS ANGELES

For several years the writer has used the type of eye dressing about to be described, with a great deal of satisfaction, for it has the advantages of being neat, comfortable, easily removable by intention, and holding firmly in place for from twenty-four to forty-eight hours if desired. One can also tell if the patient has tampered with the dressing for he cannot stick it back in place after it is once removed, without the use of additional adhesive.

The essentials for the application of such a dressing are cotton, a piece of small-meshed gauze, and a quantity of liquid adhesive as manufactured by Johnson and Johnson. This is supplied by the manufacturers in a collapsible tube, but it is found more convenient to empty the contents of this tube into a wide-mouth bottle which is sealed with a screw cap lined by tinfoil. This lining is essential for otherwise the adhesive will stick to the cap. It is also necessary not to leave the bottle open except when actually using the adhesive because it thickens on exposure to air.

Figs. 1-5 (Weymann). Steps in liquid adhesive eye dressing.

The method of application of this dressing is well shown in the photographs. In figure 1 a small pad of gauze is placed over the closed lids to prevent fibers of cotton from working in between them. In figure 2 sufficient cotton is placed over the gauze to be level with the brow and bridge of the nose so that sufficient pressure will be made on the lid to keep it closed. A ring of liquid adhesive has been painted on the skin surrounding the cotton pad circumscribing the eyebrow in the next picture, and in figure 4 a piece of gauze has been stretched across the cotton pad and pressed down firmly into the ring of liquid adhesive. This is held in place for a few seconds with flattening down of the uneven places by running the blade of a dressing scissors over the gauze where it comes in contact with the liquid adhesive. The adhesive hardens sufficiently in about one minute so that the edges of the gauze may be trimmed off up to the ring of adhesive leaving the neat, smooth dressing shown in figure 5. The gauze is so flexible that where a patient wears glasses there usually is no trouble wearing them over this type of dressing.

To remove the gauze one merely peels it off gently as with ordinary adhesive, but it comes away with far less pain to the patient. Similar more localized dressings may be applied to small incisions in the lid and brow without the necessity of covering the entire eye.

903 Westlake Professional Building.

THE OCULOCARDIAC REFLEX

Report of a Case Exhibiting a Marked Reaction Following Enucleation of the Eyeball

JOHN H. BAILEY, M.D.
BROOKLYN

A carpenter, 31 years old, in good general health, injured his left eye, which was subsequently removed. At the time of the operation, as the optic nerve was cut across, a severe hemorrhage occurred. The bleeding was controlled by sealing the operative conjunctival wound with a water-tight suture. The pent-up blood in the orbit caused a marked rise in the intraorbital pressure. As the patient was about to leave the operating room, he went into a state of apparent shock which was accompanied by an alarming slowing of the pulse. The afferent and efferent pathways of the oculocardiac reflex are described in detail, and the rationale of the phenomenon discussed. The electrocardiograph was employed in two experimental cases to elucidate the cardiac element in the reflex.

The oculocardiac reflex, the essential feature of which is retardation of the heart beat when adequate pressure is exerted upon the contents of the orbit, was first mentioned by Dagnini in June, 1908 (Dagnini, G.: Intorno ad un riflesso provocato in alcuni emiplegici collo stimulo della cornea e colla pressione sul bulbo oculare. Boll. di scienze med., Bologna, 1908, v. 8, p. 380). Four months later, Aschner (Aschner, B.: Ueber einen bisher noch nicht beschriebenen Reflex vom Auge auf Kreislauf und Atmung. Verschwinden des Radialpulses bei Druck auf das Auge (Vorläufige Mitteilung). Wien. klin. Wchnschr., 1908, Oct. 29, no. 44, p. 1529) described the same reflex, and believed that it had not been previously reported. Hence, this oculocardiac phenomenon often appears in the literature under the eponym, "The Dagnini-Aschner Reflex."

There is much difference of opinion as to the significance and interpretation of this reflex. The ophthalmologist is particularly interested in the reflex as an episode in orbital surgery, as so forcibly illustrated by the case reported herein.

The reflex may be considered normal if the pulse is slowed 4 to 12 beats per minute; exaggerated, when slowed more than 12 beats per minute; and inverted, if the pulse is accelerated instead of retarded. The reaction varies not only in different individuals, but even in the same individual at different times, being influenced by such factors as the degree of pressure employed, the posture of the subject, his emotional state during the experiment, his physical condition, and his nervous set-up.

The reflex is elicited as follows: The patient assumes a comfortable seat in a chair or reclines on a couch. He is requested to relax completely, both physically and mentally. After waiting a few minutes, the experimenter notes the properties of the radial pulse. The lids are now gently closed, and with forefinger and thumb the eyeball is forced steadily but rather quickly into the orbit in a downward, backward direction, and the effect upon the pulse observed as regards its frequency, amplitude, rhythm, force, and volume. The systolic and diastolic pressures are ascertained by an assistant taking a sphygmomanometric reading on the opposite side. More detailed data, if desired, can be furnished by the electrocardiograph. The reflex appears in a few seconds, and the time of the experiment need not continue more than a few minutes to obtain the necessary information. The pulse becomes slow, full, and may even intermit. Besides these pulsatory phenomena, the respirations become deeper, less frequent, and occasionally spasmodic. General symptoms may appear, such as sensation of heat or cold, sweating, headache, vertigo, faintness, substernal constriction, epigastric pain, nausea, and vomiting.

The reaction is, in general, *ceteris paribus*, proportional to the degree of pressure employed. A pause of several seconds may ensue between the cardiac contractions; and, if still greater pressure is exerted, the heart may come to a permanent standstill in diastole, particularly in those with vagotonic disturbances; hence the need of caution in patients of this type. The response to the test may be considered an index of the state of the autonomic nervous system. In vagotonia, the reaction ap-

pears sooner and more intensely; in sympatheticotonia, the pulse may even be accelerated.

The oculocardiac reflex, as a rule, is suppressed by atropine; conversely, when the pulse has been slowed by pressure upon the eyeball, the administration of atropine will nullify the effect. Pilocarpine influences the reflex in a contrary direction. In bradycardia, the reaction is more pronounced and the test should be done with circumspection. On the other hand, an attack of paroxysmal tachycardia may be aborted by provoking this reflex. The reflex is of value in alleviating persistent hiccough. In patients subject to angina pectoris, the reaction may initiate a cardiac crisis, or aggravate one already present. In hyperthyroidism, the response is weak; while those whose thyroid function is subnormal, give an exaggerated reaction; i.e., the former act as sympatheticotonics, the latter, as vagotonics. In tabes, the reflex is absent. Patients in deep stupor from anesthesia or other causes, may be awakened by evoking this reflex when other measures, however strenuous, are of no avail. The reflex may appear upon strong stimulation of other sensory nerves than the fifth, but the reaction is less pronounced, because the fifth nerve is more intimately connected with the tenth nerve than are the other sensory nerves, both being originally branchial nerves, and thus closely related anatomically and probably functionally. Mechanical stimulation is alone responsible for the oculocardiac reflex; for a painful condition of the eyeball, or increased intraocular tension, or compression of a luxated eyeball, is not associated with the characteristic manifestations of the reflex.

The oculocardiac reflex is unobtainable if the sensory portion of the trigeminus is blocked, experimentally or otherwise. However, irritation of the orbit, even after removal of the bulb, will elicit the reflex. Although the reflex is accompanied by increased intracranial pressure due to the cerebrospinal fluid's being forced back into the brain as a result of pressing the fluid out of the sheath of the optic nerve, nevertheless, this is not the cause of the symptoms, for the reflex is present under circumstances of normal cerebral pressure. The heart may be slowed by direct pressure upon the vagus, e.g., in the neck, but this, obviously, is not a reflex. The Kratschmer-Herring reflex, a phenomenon typified by slow, deep breathing, which may become spasmodic, is analogous to the oculocardiac reflex, and is produced by irritating the terminal branches of the trigeminus in the nose.

The case report that follows illustrates in a spectacular manner the importance of being adequately acquainted with the manifestations of the oculocardiac reflex. The reaction was so pronounced as to give rise to considerable apprehension until it was correctly analysed and appraised.

Case Report. W. H., a carpenter, 31 years old, consulted me January 4, 1927, stating that while using a hammer on a piece of brick, something broke off and struck him in the left eye. Examination revealed a superficial incised wound, apparently nonperforating in character, in the upper part of the sclera near the limbus. The lower half of the cornea was quite hazy, interfering with a clear discernment of the fundus details: the latter, however, appeared to be normal. The pupil was moderately dilated, somewhat irregular, and did not react to light nor to accommodation, due to an obvious tear in the pupillary margin. The lower third of the anterior chamber was filled with blood. The intraocular tension was not elevated. Vision in the right eye was 20/50; in the left eye, 20/200.

The patient returned February 24, 1927, one month and 20 days after the first visit. A note at this time stated that the pupil of the affected eye was dilated and immobile (a traumatic defect in the sphincter iridis), the eye deviating outward; there was, however, no ocular palsy, the strabismus being comitant and attributable to the poor vision. The fundus was normal. Vision in the right eye was corrected to 20/20 minus with a concave sphero-cylinder. Vision in the left eye was unimproved with lenses. The crystalline lens was becoming cataractous. The blood in the

anterior chamber had been absorbed, and the cornea was clear. Three months later, the patient again consulted me, complaining that the vision in the injured eye continued to deteriorate. The cataract was now quite advanced.

On July 25, 1928, the ocular status was as follows: The left eye was divergent, but its excursions were not restricted in any direction of the gaze. The iris seemed to be atrophic, the pupil being moderately dilated and fixed. The lens was completely cataractous, emitting a greenish sheen. There was light perception in the nasal field only. Vision in the right eye with —50 D. sph. ⊂—1.25 D. cyl. axis 180° was 20/30. Diagnosis: cataracta traumatica; consider siderosis bulbi due to retention of particle of iron. The X-ray examination taken the following day was negative.

I next saw the patient October 31, 1932. The anterior chamber was abnormally deep, in its lower periphery was a loose piece of pigmented tissue resembling a fragment broken off from a melanotic growth of the iris or ciliary body. The intraocular tension was moderately increased, iridodonesis was present, caused by a backward displacement of the cataract. Enucleation was advised, and was performed the following day.

The operation was done under local anesthesia. Two c.c. of a 2-percent solution of novocaine, containing a little adrenalin, was injected in the region of the ciliary ganglion and 5 drops of cocaine hydrochloride instilled at intervals into the conjunctival sac. The operation proceeded uneventfully. However, when the optic nerve was cut across, there was profuse bleeding from the severed vessels. Since pressure and heat did not control the bleeding, and as sterilized artery clamps were not available, I effected hemostasis by putting a water-tight continuous suture in the lips of the conjunctival wound. The blood, thus pent up in the orbital cavity, had no avenue of escape, and compressed the sensory innervation of the orbit. The sutured conjunctiva with the enclosed blood protruded for an appreciable distance beyond the interpalpebral fissure.

The toilet of the wound was being completed, when the patient commenced to complain of feeling faint. He had become very pale, and a copious cold perspiration bathed his face and neck. He was nauseated and made several attempts to vomit. There was precordial distress. The pulse was 65. Very soon it dropped to 60, then to 55 and became progressively slower until it reached 30 per minute. It would frequently lose a beat. Each pulse wave, however, was full and strong. This state of affairs, namely the threatened syncope, the precordial pain, the nausea, the cold clammy skin, and the irregular and slow pulse, continued for almost two hours, and caused me no little concern. It seemed that the heart beat soon would cease altogether. It then suddenly dawned upon me that I was confronted with a very much exaggerated oculocardiac reflex brought about by the extreme pressure of the blood imprisoned in the orbit which had no means of exit. The floor nurse set my mind at ease by volunteering as a subject for the following experiment: Closing the lids of her left eye, I exerted increasing pressure upon the eyeball. Her pulse became slow and irregular, and she was presenting a clinical picture similar to that of my patient, when I discontinued the pressure. I felt much relieved and left the hospital, instructing the patient to visit my office the next morning. The patient kept the appointment, none the worse for his experience of the day before.

The removed eyeball showed several tears in the periphery of the iris, the lens was opaque and displaced to the left and downward. In the anterior chamber was a detached piece of iris tissue that had been torn off near the ciliary border when the patient had sustained the original injury. Upon cutting into the cataract, there was an escape of cloudy fluid and the cataract collapsed —cataracta liquefacta. Microscopically, there was no sign of any neoplastic or inflammatory process, except possibly for some deposit of pigment upon the anterior surface of the iris. There was no evidence of siderosis.

The rationale of the oculocardiac reflex is as follows: When adequate pressure is exerted upon the orbital con-

tents, the sensory innervation of the orbit, mainly the subdivisions of the ophthalmic branch of the 5th nerve, is stimulated; the stimulus travels to the upper and inner part of the Gasserian ganglion, whence it is continued along the sensory root of the trigeminus to the reception nucleus in the pons. From here the impulse is carried along by axones, or collaterals, that arborize around certain specific cells in the nucleus of the 10th nerve, the center of the reflex arc. Processes also terminate in the cardio-augmentor, vasoconstrictor, and respiratory centers in the bulb, producing their respective effects upon the heart rate, blood pressure, and respiration. The efferent pathway to the heart is via the cardiac branches of the vagus and the sympathetic. The sympathetic branches leaving their ganglia in the neck and upper thorax (and thus becoming postganglionic fibers), unite with the vagal branches to form the cardiac plexuses. These plexuses contain, accordingly, postganglionic sympathetic fibers and preganglionic parasympathetic fibers. The fibers then proceed to ganglia present in the heart substance whence they continue to their several destinations (the vagal fibers having by now become postganglionic). Some of the fibers enter the sino-atrial node, others the atrio-ventricular node and bundle, so that these structures are supplied by two sets of nerves; sympathetic, which augment their action, and parasympathetic, which inhibit them. Thus the rate of the heart beat as affected by these nerve factors is the resultant or the algebraic sum of two opposite influences; the vagal influence, however, usually predominates. It is believed that the atrial-ventricular bundle is supplied chiefly by the left vagus, while the sino-atrial node is controlled in greater measure by the right vagus.

I wish to thank Dr. Levenson, an intern in the Beth El Hospital, and Dr. Schwartz, a recent alumnus of the same institution, for kindly volunteering to submit to electrocardiography while increasing pressure was exerted upon their eyeballs. The left eyeball in each instance was purposely chosen in the experiment with the object of determining the part, if any, played by the auriculo-ventricular node and bundle in the mechanism of the reflex, for the prevalent view is that the left vagus acts mainly upon the A.V. bundle and only to a slight degree upon the sino-atrial node, which is chiefly innervated by the right vagus. It will be recalled that in the case reported herein, it was the left eyeball that was removed. The electrocardiogram showed that the modification of the heart action was due primarily and, apparently exclusively, to the effect upon the sino-atrial node, and that the A.V. bundle was not responsible for any part of the reaction. The heart was slowed (sinus bradycardia) because of inhibition of the sino-atrial node. This portion of the tracing revealed no abnormality in the character of the waves, the only change being an increase in the time factor of the cardiac cycle as a whole. That the heart cavities were being adequately filled and their contractile power was unimpaired was proved by the quality of the radial pulse which was full and strong. The dropped beat, when it occurred, was ascribable to sinus block, there was no direct involvement of the A.V. bundle or ventricle: the graph presented a complete obliteration of the auricular complex and total absence of ventricular excitation; the heart was in a state of pause. The heart had stopped contracting because the sino-atrial node was at times so depressed by the vagus that it could no longer initiate any heart impulse—this was evidenced by intermittent cessations of the radial pulse.

The symptoms manifested by my patient had to be differentiated from shock and novocaine poisoning. Very rarely does novocaine give rise to toxic symptoms, although a few such cases are reported in the literature. Novocaine poisoning is characterized, as is shock, by general weakness, pallor, cold clammy perspiration, precordial pain, oppressed breathing, and a pulse that is small, rapid, weak, and irregular. My patient's pulse was full, strong, and slow, factors that determined the differential diagnosis.

855 St. Marks Avenue.

AN OPERATION FOR GLAUCOMA

JOHN G. MCLAURIN, M.D.
DALLAS, TEXAS

The author describes in detail an operation that he has successfully used in controlling both acute congestive and simple noncongestive glaucoma. It combines the principles of a broad iridectomy, a cyclodialysis, a Lagrange operation, and an Elliot trephining done under a flap. If glaucoma is complicated with cataract or dependent upon the cataract, it is possible to extract the cataract with a fair degree of safety and simultaneously relieve the glaucoma. The filtering scar is quite resistant to later infection. Read before the Dallas Southern Clinical Conference, March 29, 1934.

In 1923, an old lady, suffering with acute congestive glaucoma associated with an intumescent cataract, came under my care. The lens was so swollen that the anterior chamber had become extremely shallow, with the root of the iris pushed firmly over the pectinate ligament and closing off the filtration angle. No general medical measures nor local treatment had any influence on the tension. After three days, I did a broad iridectomy, but it did not relieve the tension and I realized that the cataract would have to be removed before the tension would decrease. It was clear that it would be difficult to remove the cataract under such high tension without running a great risk of having the eyeball expel its contents. Finally, I decided on a procedure that I thought would take care of the condition with the least possible risk. I knew of no classical operation that could be used with safety, so I devised a plan that combined the good points of several different procedures and thus managed to remove the cataract and relieve the glaucoma. There were no accidents at the time of operation and the results for the patient were excellent. Since that time, I have adopted this procedure with a few refinements in the technic, and have been well satisfied with it. The operation can be used for the relief of simple or congestive glaucoma with or without cataract. I will attempt to illustrate the various stages of the operation with pictures and to explain the essential details.

Preoperative preparation consists in giving the patient an enema a few hours before operation. If the blood pressure is high, venesection should be done and the systolic tension reduced to 170 mm. of mercury, or less, if the withdrawal of blood is well tolerated. This is done 6 to 12 hours before the operation and it will usually cause a reduction in intraocular tension. Ten grams of sodium chloride, given intravenously, 12 to 24 hours before operation, will frequently cause some reduction in the intraocular tension. The measures described are necessary only in the congestive cases. Sodium bromide, grains 45, and 15 grains of chloral hydrate are given one hour before the operation. If the pain is very intense codeine and aspirin are given by mouth.

With the eye under the influence of a miotic, a solution of 4-percent cocaine is instilled into the eye three times, at intervals of two minutes, and then the conjunctival sac is washed out with a solution of mercury oxycyanide (1:5000) followed with a saturated solution of boric acid. The lacrimal sac should have been freed of infection, if possible, before the operation.

Akinesis is performed according to the Van Lint method. The apex of the orbit is injected through the outer, lower conjunctival fornix, with 1 c.c. of 2-percent novocaine solution to which has been added 4 or 5 minims of adrenaline chloride (1:1000). This usually causes a drop in intraocular tension of 10 to 25 mm. of mercury within 10 to 12 minutes. It also helps to produce anesthesia. While waiting for the apical injection to take effect, 4-percent cocaine solution is instilled into the eye every two minutes, with an occasional drop of adrenalin solution (1:1000).

A Guist retractor (fig. 1) is placed to hold the lids back and away from the eye and an incision is made with scissors. A Guist retractor is not shown in these pictures because the nose, which helps support the retractor, is not included.

The incision is concentric to the lim-

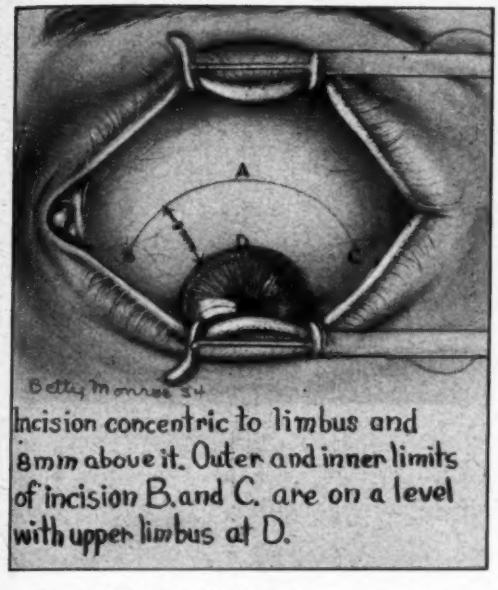

Fig. 1 (McLaurin). Incision 8 mm. above and concentric to the limbus. Outer and inner limits of incision, B and C, are on a level with the upper limbus at D.

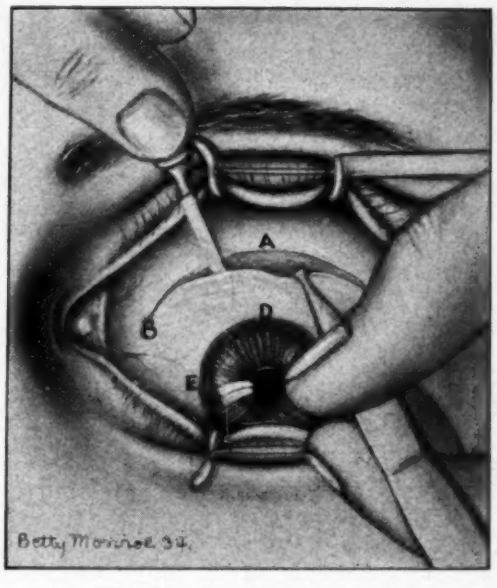

Fig. 2 (McLaurin). The lower half of the dissection, extending down to the limbus; best performed with a Graefe knife.

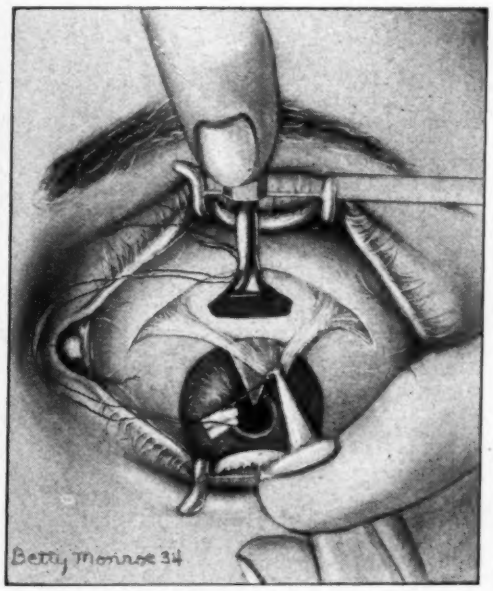

Fig. 3 (McLaurin). Scleral incision made with a No. 2 or 3 Jaeger bent-lance keratome.

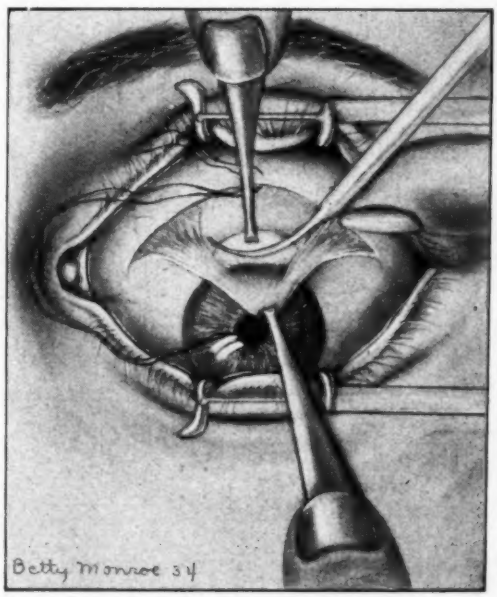

Fig. 4 (McLaurin). Sclerectomy performed with curved iris scissors.

bus and is started 8 mm. above it in the mid-line at A. It is continued around and downward, parallel to the limbus, so that the outer and inner extremities of the incision at B and C are on a level with the upper limbus at D. It is essentially the same incision finally adopted by Col. Elliot in his sclero-

corneal trephining operation. A flap dissected from such an incision creates a wide area for subconjunctival diffusion of aqueous.

The conjunctival flap is pulled forward with forceps while scissors are used in dissecting it rather superficially away from the eye, some subconjunctival tissue being left. In this way neither the insertion of the superior rectus nor Tenon's capsule can be injured. Dissection with the scissors extends downward, 4 mm. from the line of incision, which is half the distance

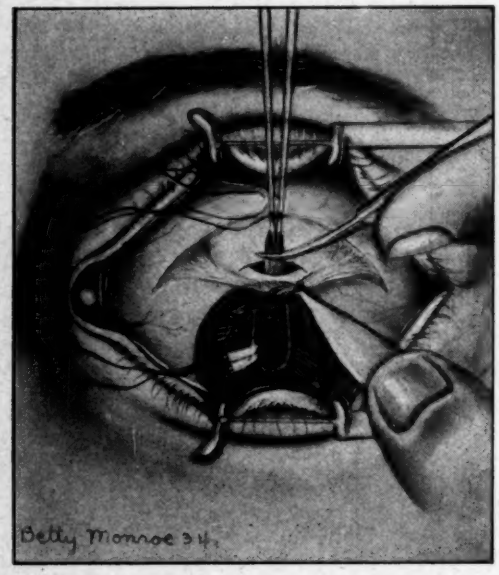

Fig. 5 (McLaurin). Broad peripheral iridectomy; iris held with Barraquer iris forceps and cut with curved iris scissors or de Wecker scissors.

from the incision to the upper limbus. The lower half of the dissection (fig. 2) is done best with a Graefe knife and should remove all subconjunctival tissue from the sclera, as far down as the upper limbus and as wide as the cornea. The subconjunctival tissue is not disturbed in the areas between the lower inner and outer limits of the incision B and C, and the limbus at E and F.

A mattress suture is placed in the flap and upper central edge of the incision, so that it would be possible to close the wound promptly in the event of any accident during the operation, and to expedite completion of the operation after the intraocular work has been done.

The scleral incision (fig. 3), made with a No. 2 or 3 Jaeger bent-lance keratome, is started 3 mm. above the upper limbus with the instrument directed almost toward the center of the lens; but as soon as it has cut through the sclera, the direction of the cut is changed so that the point of the keratome is directed to the mid-posterior corneal surface. Of course, the point of the keratome should never touch the cornea. While the keratome is still in the incision there will be very little, if any, escape of aqueous. The keratome should then be slightly depressed on one side so that the outflow of aqueous will be very gradual. In this way the intraocular tension will be decreased slowly. By this procedure a luxation of the lens, loss of vitreous, or intraocular hemorrhage may be avoided.

The incision is designed to do what may be termed an anterior cyclodialysis, by separating the anterior portion of the ciliary body from its scleral attachment; then it should pass forward, medial to the scleral spur, between the pectinate ligament and the root of the iris.

A sclerectomy (fig. 4) is done with curved iris scissors. It should remove from 1½ to 2 mm. of the anterior scleral lip, according to the amount of filtration required, and extend forward toward the limbus so that 1½ to 1 mm. of the sclera is left above the limbus. This stage of the operation is almost identical to that of the Lagrange sclerectomy.

With a Barraquer iris forceps the iris is then caught up very broadly near its base (fig. 5) and drawn out through the scleral opening. In so doing, the root of the iris will probably tear away from its attachment, and this is desirable. At any rate a broad peripheral iridectomy is done by horizontally cutting the iris with either curved iris scissors or De Wecker scissors.

After the peripheral iridectomy has been completed, the iris will usually fall back into its position. If, however, it shows any tendency to remain out of position, a few quick, gentle strokes

across the cornea with the flat surface of a pillar repositor will promptly bring it into position. The pillar repositor should not be used in the anterior chamber because of the possibility of injuring the lens, later causing it to become cataractous.

Figure 6 is a cross section showing the direction in starting and finishing the scleral incision.

The incision is now closed by tying the centrally placed mattress suture and placing two more simple sutures about midway between the mattress suture and the extremities of the incision. As a rule, the anterior chamber re-forms in within 24 to 48 hours.

A cross section (fig. 7), shows that an anterior cyclodialysis combined with a broad peripheral iridectomy has been accomplished. A sufficiently large sclerectomy promises adequate permanent drainage. In other words, the aqueous formed in the posterior chamber has a free escape through the scleral opening and will spread out under the conjunctival flap to be picked up later by the subconjunctival vessels. The angle of filtration has been completely opened

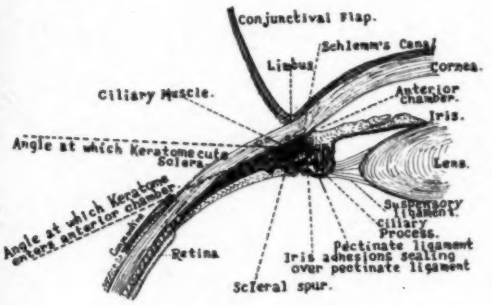

Fig. 6 (McLaurin). Cross section showing the start and finish of the keratome incision.

and the pectinate ligament uncovered, with a possibility of fluid again entering Schlemm's canal.

The filtering bleb is raised above the surrounding conjunctival tissue. It is probably raised 1 mm. at its highest point just in front of the scleral opening. The flap may become rather tightly tied down by scar tissue along the line of incision. This, however, can be avoided to a considerable extent by starting gentle massage daily over the line of the incision as soon as healing has been completed. It should be started before a firm cicatrix has developed and an effort should be made to create a loose line of healed incision. Under massage, the entire flap will be raised by the aqueous escaping from the scleral opening. Even if the flap should heal down tightly along the line of incision there will be sufficient room to allow the aqueous to escape between the

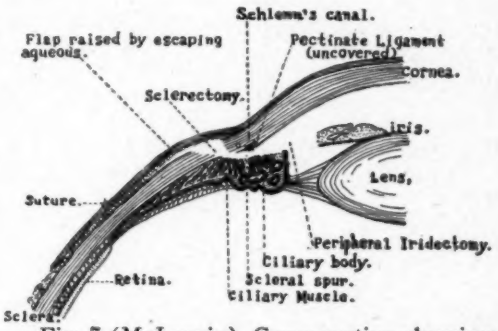

Fig. 7 (McLaurin). Cross section showing sclerectomy, anterior cyclodialysis, broad peripheral iridectomy, and conjunctival flap sutured down in position.

lower extremities of the incision and the limbus at B.E. and F.C. (fig. 1). The conjunctival vessels have not been damaged at these areas and will readily pick up the aqueous. A large flap, as described, affords greatest protection against postoperative infections. Nor are subsequent infections so likely, because the filtering bleb is comparatively flat and broad, with a fairly strong conjunctival covering, whereas with a small flap the bleb may become quite prominent and be easily damaged. A small, prominent bleb also has a greater tendency to become cystic, and its thin walls give little protection from infection entering the globe, in the event of an acute catarrhal conjunctivitis or of trauma followed by infection.

Figure 8 shows the scleral incision enlarged downward with iris scissors curved on the flat or preferably with Walker's corneal scissors. This is done only when cataract exists, to permit its extraction. The conjunctiva should be dissected, up along the line of the limbus on each side, so that the scleral incision can be readily and safely carried

downward on each side of the limbus to include almost its upper half. The scleral edge above is gently pulled forward with an Elschnig single mouse-tooth forceps, while extending the incision downward. The cataract is removed, preferably by the Elschnig intracapsular method, but may be removed after capsulotomy, if this method is thought more advisable. After the cataract is extracted the wound is closed as described previously.

Fig. 8 (McLaurin). Scleral incision enlarged downward with Walker's corneal scissors in order to remove cataract by either an intracapsular method or capsulotomy.

The eye is dressed with 2-percent pilocarpine in (1:5000) oxycyanide-of-mercury ointment. Once each day thereafter 2-percent pilocarpine is instilled into the eye until healing is complete.

The advantages of the operation are such that it has proved to be quite safe in the control of even acute congestive glaucoma associated with cataract. If a cataract is not present, the operation is greatly simplified. It can be used also for simple glaucoma, and establishes a rather ideal type of drainage with the least possible chance of later infection. It can be done in cases where a Lagrange procedure would be inadvisable because of a very shallow anterior chamber. The filtering scar is well up under the upper lid, and does not extend so low as the Elliot trephine scar because the dissection does not penetrate the cornea, as in an Elliot procedure. It combines the principles of a broad iridectomy, a cyclodialysis, a Lagrange operation, and an Elliot trephining, done under a flap, and makes possible the extraction of a cataract with reasonable safety, if cataract is a complicating etiological factor. With this procedure an ideal drainage is established.

From talking with various oculists, I have concluded that in all probability an operation somewhat similar to this has been done from time to time by all of them. Each man varies decidedly in his technic, and since this procedure has never been described, I thought it worth while to give its details in the various stages, especially since I have been doing the operation for more than ten years and it has given me excellent results.

Medical Arts Building.

GLAUCOMA CAPSULARE

THEODORE M. SHAPIRA, M.D.
CHICAGO

Glaucoma capsulare is one of the more recently defined eye conditions, the diagnosis of which was first made by Vogt in 1925. The condition is not uncommon and if each case is examined with the slitlamp, many will be found which might have been overlooked, especially in cases of so-called glaucoma simplex. Usually, if a weak euphthalmine solution is used for mydriasis, the condition is readily diagnosed. A white fuzzy appearance of the pupillary collar is seen and in the anterior chamber some of the exfoliated capsule particles are discernible. The anterior lens capsule has a central opaque disc, while the concentric periphery is usually clear. These exfoliated particles in the anterior chamber soon block its angle and a secondary glaucoma sets in. Primarily, the exfoliation is due to a senile sclerosis of the anterior lamellae of the lens capsule. With this condition, we see further that the lens capsule may be a definite factor in the production of ocular pathology. From the Von der Heydt service of the Illinois Eye and Ear Infirmary.

In 1918, Vogt observed a 72-year-old patient with a peculiar gray membrane on the anterior lens capsule. He followed the case over a period of years and demonstrated it in Basel, in 1922, as an atypical case of persistent pupillary membrane, since at the same time there were other pupillary fibers present. The eye developed glaucoma later. From 1919 to 1925, he observed 12 similar cases, in 10 (83 percent) of which there was progressive glaucoma. The youngest patient was 61, and the oldest, 82 years old.

He observed in these cases a rigidity of the iris towards mydriatics and an absence of previous inflammation. Early demonstrable changes which he noticed were fine gray opacities, tears, and sclerosis of the superficial surface of the anterior capsule. The opacity began in more or less concentric zones in the periphery and finally resulted in opaque radial areas. In observations over months and years, he found that new areas of the anterior capsule were always involved in the process and that the supposed membrane was capsule substance itself. He found that the condition was unrecognized, in many instances, until after the pupil was dilated with cocaine or, if necessary, homatropine, which was followed by miotics.

At first he thought that the glaucoma was primary and the exfoliation secondary, but he later reversed this interpretation when he considered that in many cases there was no glaucoma, and in some cases the glaucoma appeared later in the course of the observations. That the capsular degeneration was not a result of the glaucoma was shown by the cases with permanent normal tension.

In 1925, he[1(a)] first described Glaucoma capsulare as a type of secondary glaucoma due to exfoliation of the lens capsule. Five years later, he[1(b)] made the statement that the condition was not at all uncommon and reported at that time 45 cases of exfoliation of the lens capsule, 34 (or 75 percent) of which had an associated chronic glaucoma. In a series of 185 cases of so-called primary glaucoma, 13 (or 7 percent) had lens-capsule glaucoma.

Glaucoma capsulare, according to Vogt, consisted essentially in a combination of two distinct processes. A degenerative (senile) process takes place in the anterior lamella of the lens capsule. Then the normal movements of the iris in contraction and dilatation of the pupil rub off this degenerated material, which is thrown into the aqueous. Once in the aqueous, it reaches the chamber angle, which becomes obstructed. Vogt further stated that the same process could affect the posterior capsule as well, but was less noticeable since the mechanical influence of the iris was missing.

This was a heretofore undescribed type of secondary glaucoma, due to a mechanical blocking of the chamber angle. In discussing factors responsible for the production of secondary glaucoma, E. Fuchs[2] mentions impermeability of the pectinate ligament, due to blocking of its spaces by blood, leucocytes, or precipitates as an anatomical change. Since cases of glaucoma cap-

sulare are exactly analogous, the increase in intraocular tension seems to be due to a mechanical obstruction rather than to anatomic changes, because, primarily, the pectinate ligament is anatomically normal.

In 1930, Kirby[3] reported seven cases and defined exfoliation of the lens capsule as a separation and exfoliation of the most superficial lamella of the lens capsule. That the lens capsule could be chemically separated into layers was demonstrated by Berger[4], in 1882. On the other hand, Salzmann[5], in preslitlamp days, said "a lamellar composition of the lens is ordinarily not seen, yet a thin superficial lamella often appears in the region of the equator." In discussing ocular senescence, Salzmann did not mention exfoliation of the lens capsule. But for the advent of the slitlamp, this condition would most probably have gone unnoticed.

In describing separation or detachment of the zonular lamella, in 1922, Elschnig[6] was the first actually to demonstrate a lamellar structure of the anterior lens capsule. He described slitlamp findings from three glass-blowers' eyes and concluded that the zonular lamella was separated from the entire lens capsule, leaving a space like an open window.

It remained for Vogt[1(c)] to describe exfoliation of the anterior lens capsule as a causative factor in producing secondary glaucoma. In contrast to the windowlike central areas, in separation of the zonular lamella, Vogt described central opaque discs.

In years gone by, the lens capsule was thought to be negligible as a factor in producing ocular pathology, but with the aid of the slitlamp we see that the lens capsule is a definite factor that must be taken into account when the production of such disease is considered, both Elschnig and Vogt having reported their findings since the introduction of the slitlamp.

In 1927, Alling[7] reported seven cases of capsular exfoliation with glaucoma, and stated that the exfoliation had nothing to do with the glaucoma. That this was erroneous had already been proved by Vogt.

Waite[8] reported a case of capsular cataract with glaucoma before the New England Ophthalmological Society, in March, 1933. In this case, slitlamp examination showed typical exfoliation of the outer layer of the anterior lens capsule with many exfoliated particles stuck to the pupillary rim and to the posterior corneal surface. In this case the eye was the only remaining one, and extraction of the lens was advised in order to reduce the tension.

Recently, three cases of capsular glaucoma have come under my observation.

Report of Cases

Case 1. J. H., aged 60 years, had noticed two years previously that vision in his right eye was diminishing. About one year ago, he found that he had lost vision in that eye completely. Now he states that his left vision is failing. Externally, both bulbi were negative. Under slitlamp examination, both lenses showed the same processes, but more marked in the right eye. The lenses were cataractous and presented sclerotic capsule changes. Centrally, there was a faint greyish disc. There was a bluish-grey, fuzzlike appearance at the pupillary border of the iris. In the anterior chamber, small particles of exfoliated material could be seen if the eye were put in rapid motion and suddenly stopped. Daily tension varied from 36 to 45 mm. of mercury. Since miotics were of no benefit, extraction of the right lens was advised. Tension in the left eye was never found above 25 mm. of mercury.

Case 2. G. G., aged 60 years, was unable to give an intelligent history. Right vision was 0.1—1; the left, questionable light perception. Tension in both eyes varied between 30 and 39 mm. of mercury. Slitlamp examination showed the following details: In the right eye, senile capsular sclerosis with greyish-white, frostlike appearance of the pupillary border of the iris. The pupillary collar was gone. In the left eye, senile atrophy of the iris with typical fuzz on the pupillary border.

Case 3. J. F., aged 63 years, stated that for the past year his right vision

had been failing, and for the past six months his left visual acuity had been decreasing. Slitlamp examination showed opacities of both lenses with typical fuzzlike appearance of the pupillary border of the iris. In addition there was a hyaline degeneration of the pupillary borders on both sides. The tension in each eye, taken repeatedly, approximated 44 mm. of mercury.

After trephine operations had been performed in some of the cases at his clinic, Vogt decided that they do not do so well as the usual cases of glaucoma.

58 E. Washington Street.

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SUTURES FOR LID CONTROL IN CATARACT OPERATIONS

WARREN D. HORNER, M.D.
SAN FRANCISCO

The illustration adequately presents the placing of the recommended sutures, which have been devised to aid the surgeon who operates with an untrained assistant. From the Department of Ophthalmology, University of California Medical School.

Sharp, in 1753, pointed out the probable value of the blepharostat, and at the same time laid down certain basic requirements for its efficient design. He said, "I should not be surprised if the use of a speculum oculi should hereafter he esteemed an improvement. But then it must be contrived so that it shall not compress the globe of the eye; or if it does, the operator must be careful to remove it the instant the incision is making, lest by continuing the pressure after the wound is made, all the humors should suddenly gush out."

In the one hundred and eighty-one years which have elapsed since Sharp's statement, man's ingenuity has been taxed in eliminating the very fault that he pointed out. It is doubtful whether any of the fifteen models of blepharostats illustrated in a recent instrument catalogue can be said to eliminate pressure on the globe completely. The number of types illustrated is evidence that the perfect model has yet to be designed. Present models are unyielding in their action, and do not allow rapid nor easy closure of the lids at critical times, such as the momentary loss of a patient's self-control or a sudden vitreous prolapse.

For obvious reasons, many surgeons have substituted lid retractors or manual separation for the speculum, either following the incision or from the start of the operation. Such lid control has the advantages of being more pliable, less irritating to the patient, and of allowing rest periods at any stage when a lessening or removal of lid tension is desirable. These measures, however, are not safe in the hands of an untrained assistant and have the further disadvantage of occupying both his hands during the entire operation.

Until fairly recently, the author's

ophthalmic service at San Francisco Hospital afforded no surgical assistants save internes, who were assigned to his department each month. I was thus forced to operate with a speculum, which I have never liked, or to trust untrained fingers in manual lid control. In 1931, I conceived the idea of substituting lid sutures for separating the lids. Under local anesthesia, a single, long white silk suture was therefore run through the skin of the middle third (about 6 mm.) of both upper and lower lids parallel to and about two millimeters from its edge, the ends being knotted and held by the assistant. Pulling on the strands caused the eye to be held well open, while directing the tension somewhat away from the globe caused the lids to be lifted from the eyeball. Further trial demonstrated the following advantages: an interne could do this safely; the lids, relaxed by the usual akinesis injection, were easily opened and their weight lifted from the globe; the upper suture served as a handle for pulling down the lid and closing the eye instantly when desired, and as often as desired; by making the suture sufficiently long (6 inches per strand) the assistant's hand did not interfere with manipulation at the upper limbus; any squeezing on the part of the patient was apparent at once and there could be immediate lessening of the lid tension. The lower-lid suture if weighted by a mosquito hemostat or clamped to the drapes could be let go at any time to allow the assistant a free hand for sponging or other duty.

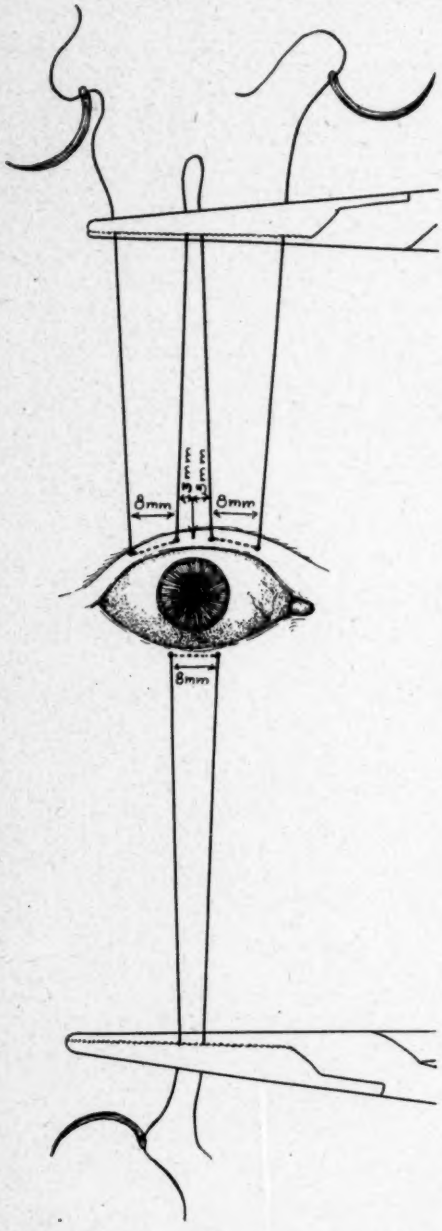

Fig. 1 (Horner). The lid sutures in place.

At the end of the operation, the eye is closed by traction downward on the upper suture, during the instillation of medicaments and the fitting of the eye patch. The lower suture is removed first; the upper is cut but not pulled out until the dressing is in place.

One disadvantage appeared at times in that too narrow a bite in the upper lid or too much tension caused the upper lid to tent or fold vertically and press on the globe. Occasionally, eversion of the lid was troublesome.

In discussing the new technic with Prof. Joseph L. McCool and other members of our eye staff at the University of California Medical School, the former suggested multiple bites in the upper lid instead of the single one in order better to distribute the lift on the lid. This proved to be a valuable modification and was immediately adopted. Undue folding and eversion of the lid were practically eliminated.

Lid sutures have entirely supplanted other means of lid control in cataract operations by our staff, and we think, after about three years' trial, that they have amply demonstrated their superiority over other methods.

The present technic is as follows: Subsequent to the usual administration of novocaine for akinesis and a deep orbital injection, a small amount of novocaine is injected near the edge of both lids. These have been cleansed and have had the lashes clipped short in the usual manner. The least amount of novocaine sufficient for anesthesia is best in order to lessen the degree of lid edema.

A long (24-inch), moderately heavy, double-armed suture of white silk is introduced beneath the skin of the upper lid, 2 mm. above its free edge. Each needle penetrates the skin superficial to the tarsus, about 3 mm. on either side of the mid line and emerges about 8 mm. away, running parallel with the lid margin. These two sutures thus appear in the shape of a W (fig. 1) when seen from below, and provide four strands to support the lid. Six or more strands may be used if desired. The four threads are spread and caught between the jaws of a straight hemostat, after adjusting each so that the tension on the lid is equal in all four and a normal lid contour is maintained.

The handle of the hemostat is at right angles to the strands and points to the left side of the patient, where the assistant holds it in his right hand. He also holds with the same hand the superior-rectus suture which depresses the globe. The operator sits at the patient's right side, below. Strands about six inches long allow the surgeon to work at the upper limbus without hindrance from the assistant's fingers. Operators who work from the head may prefer shorter strands.

The lower-lid suture, also of white silk and 12 inches long, is single and passes beneath the skin for 8 mm. at the mid line, 2 mm. below and parallel to its free edge. It is similarly held by a light hemostat whose weight is sufficient to keep it taut in case the assistant lets go his left hand for other purposes during the operation or, as mentioned above, it may be clamped to the drapes.

It has been our custom to make the lid sutures white only for purposes of identification. The suture in the conjunctival flap and superior rectus are routinely black.

At the end of the operation, the assistant closes the lid by lifting and pulling down on the upper sutures and keeps it closed while ointment or drops are applied within the lower cul de sac. The lower suture is then removed. The 1st and 3d strands are now clipped close to the lid edge. While the dressing is held *in situ*, slight further tension on the strands approximates the lids snugly and frees the sutures from the lid.

Summary

An adequate substitute for other means of lid control in cataract operations is provided in lid sutures, which also offer the following advantages:

1. There is no pressure upon the eyeball. 2. The assistant, if unskilled, can do no harm since there is no way in which he can press upon the globe, lose his grip on the lid, or misuse an instrument. 3. Means are always at hand instantly to close the eye or momentarily to lessen lid tension, should the patient become unruly or vitreous prolapse threaten or occur. The incision can be closed and compressed by pulling the lid well down over it. 4. The assistant can have one free hand available for assistance in the operative maneuvers if needed. 5. One or more instruments that ordinarily enter the culs de sac are eliminated. 6. At the close of the operation, there is no instrument to be removed. 7. The lid is lifted over the incision and cannot catch in the wound in closing the eye. 8. Tension on the lid keeps it fully closed until the dressings are in place. We have found no disadvantages in this method with the exception of the few extra minutes necessary to placing the sutures. Infection at the suture points has never been observed.

384 Post Street.

INCLUSION BLENNORRHEA

S. HANFORD MCKEE, M.D.
MONTREAL, CANADA

Inclusion blennorrhea, a "new disease," is a benign form of conjunctivitis in the newborn infant, recognized since the researches of Morax in 1903. It is widely disseminated, as the reports from many countries indicate. Inclusion blennorrhea occurs in adults as well as in infants. The inclusions are generally found in large numbers. In 27 cases of ophthalmia McKee found eight cases with inclusions alone, eight with inclusions and gonococci, gonococci alone in five cases, inclusions and streptococcus in one case, streptococcus or pneumococcus alone in five cases. The author emphasizes the importance of care both in the preparation of the film and its staining. As the result of this study of 27 cases, he is inclined to agree with Stewart that the inclusions are from phagocytosed bacteria.

From the Pathological Laboratory and the Department of Ophthalmology, Montreal General Hospital. Read before the American Ophthalmological Society in Lucern-in-Quebec, Canada, July 9, 1934.

Epithelial-cell inclusions were first reported by Halberstaedter and Prowazek[1] who described them in cases of trachoma in 1907. In the original description the following is found:

"In the preparation stained with Giemsa, there were visible inside the epithelial cells in the light blue protoplasm, adjacent to the nucleus, dark-blue stained, nonhomogeneous, irregular inclusions. The embedded bodies, usually small and round or oval, gradually become larger, assume a mulberry form, and with increasing growth undergo a progressive dispersion which begins at the center. Subsequently, they usually form a cap over the nucleus. Then there appear inside the inclusion, red stained, distinct, very fine bodies, which increase rapidly, gradually causing the disappearance of the blue-stained mass. Finally they occupy the greater part of the protoplasm, while the blue-stained substances are visible only as small islands between them. In streak preparations, one may see the fine bodies also beside the cell."

It was the belief of Prowazek and Halberstaedter that the small reddish-stained granules were the active virus of the disease, and these were designated by them as "elementary bodies." They multiply by binary fission, increasing at the expense of the blue ground substance, which finally persists only in the form of scales on the surface of the inclusion and of small irregular islands inside it. The granules may finally be excluded from the host cell and be taken up by neighboring cells, thus causing spread of the infection. Prowazek considered the granules to be a primitive form of parasite, and the blue ground substance a reaction product of the cell plastin, and as the ground substance forms a mantle for the parasite, he named the latter Chlamydozoan or mantle animalcule.

This finding was soon confirmed by many observers in various parts of the world and ever since, their presence has been associated more or less closely, in the minds of many workers, with the etiology of trachoma. The first evidence casting doubt on the specificity of such bodies for trachoma was the report of their presence in other diseases, some of known bacterial origin. In an infant with blennorrhea free of gonococci, Stargardt[2] found what he took to be the same inclusion bodies that had been found in trachoma. Heymann[3] in four cases clinically and culturally gonorrheal blennorrhea of the newborn, found the same little bodies in great numbers. He discussed at that time the question of whether under the influence or irritation of the gonorrheal virus, identical formations could be generated. Heymann also reported their presence in the urethral and cervical mucosa, respectively, of the parents of children with ophthalmia neonatorum. Herzog[4] inoculated the conjunctiva of a blind human with cultures of gonococci and reported the finding of typical inclusion bodies in the material from the resulting conjunctivitis. From this he concluded that trachoma was due to a strain of gonococcus that lived as an

intraepithelial-cell parasite. Halberstaedter and Prowazek, following Heymann's report, made similar examinations with regard to infantile ophthalmia. They concluded that there was a large group of nongonorrheal ophthalmia characterized by the presence of chlamydozoa where the infection took place *intra partum*, which they looked upon as a special infectious disease—"Chlamydozoa blennorrhea." They also found bodies in the genito-urinary tract of some of the mothers, and also in the urethra of males suffering from a nongonorrheal inflammation. In a former report they stated that they believed the chlamydozoa of ophthalmia to be in morphology identical with those of trachoma, but that the two might be differentiated biologically. Heymann and others concurred in this view. The rare cases in which gonococci were also present, they classified as mixed blennorrhea. Halberstaedter and Lindner[5] also found inclusions in the urethra of patients with gonorrheal urethritis. Lindner found them in the urethra even in cases in which no gonococci could be found, also in the vaginal canal of mothers. He believed that cases of urethritis and conjunctivitis in which both gonococci and inclusions were present, represent a mixed infection with gonococci and a hypothetical inclusion virus, which when present alone causes what he called "Inclusion blennorrhea." He later advanced the theory that the viruses of trachoma and inclusion blennorrhea were originally identical, but the former by repeated passage from one conjunctiva to the other, acquired the property of producing trachoma, while the latter lives in the genital tract and produces when transferred to the conjunctiva of the newborn, inclusion blennorrhea. Other observers reported the finding of inclusions in gonorrheal urethritis, while the number of conditions in which inclusions were found continued to increase.

In May, 1911, the writer[6] reported the finding of inclusion bodies in three infants with acute purulent conjunctivitis, and stated his belief that the trachoma body so called was not pathognomonic of trachoma.

In 1914, Axenfeld[7], after a careful review of all the evidence, concluded that the inclusion bodies of Halberstaedter and Prowazek must in all probability be considered as representing a living parasite and that they are morphologically identical with those found in inclusion blennorrhea, but that the identity of the agent in the two diseases could not be settled. Lindner continued to write as though there was no doubt of the parasitic nature of the bodies, which theory has been accepted by some and rejected by others.

In 1930, James[8] reported four cases of inclusion blennorrhea in 2446 deliveries at the St. Louis Maternity Hospital. The most recent work on the subject is a monograph by Lumbroso[9]. He concludes that inclusion blennorrhea is a specific conjunctival disease almost always distinguishable clinically from gonoblennorrhea.

Inclusion blennorrhea, a "new disease," has thus been constituted. It is a benign form of conjunctivitis in the newborn infant, recognized since the researches of Morax in 1903. No doubt many of the instances in which inclusions were reported in nontrachomatous cases by Stargardt, Schmeichler[10], Heymann, and McKee, following the Halberstaedter and Prowazek report, were of this disease. It is widely disseminated, as indicated by reports from many countries. It is claimed that inclusions are present in almost half of the infantile blenorrheas, while Rötth[11] maintains that inclusions are found in 100 percent of the cases and that in Hungary there is one case of inclusion blennorrhea in every 500 eye cases. The inflammation begins acutely or subacutely from the 5th to the 9th day after birth. In the four cases reported by James[8] the onset occurred on the 5th, 8th, 11th, and 15th days after birth. The acute phase is characterized by severe conjunctival inflammation with edema and infiltration, which is especially marked in the fornices and in the lower tarsal area. The picture is very similar to the ordinary gonoblennorrhea. The acute stage, which lasts about two to three weeks, is followed by a chronic stage of some months' dura-

tion. The prognosis is good. A return to an approximately normal condition may be expected in all cases, although Lindner has reported mild corneal scarring. The degree of the discharge varies, as a rule a recession without consequence occurs. Inclusion blennorrhea occurs in adults as well as in infants. The inclusions are found in large numbers, in swarms, also many of the initial bodies are encountered. In spite of energetic treatment, the inclusions

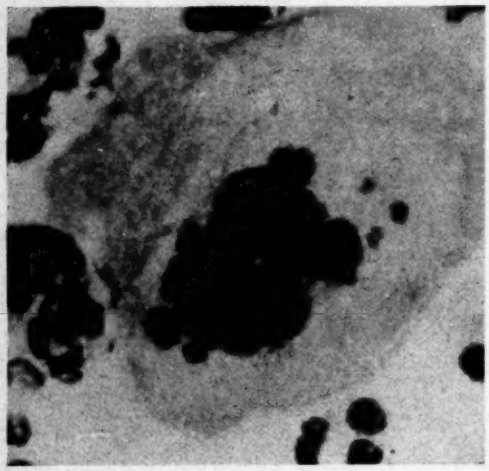

Fig. 1 (McKee). An epithelial cell with many inclusion bodies. A typical picture in inclusion blennorhea.

persist for weeks. The association of a persistent rhinitis has been noted by some observers.

In the present report of inclusion blennorrhea, 27 cases of ophthalmia of the newborn have been studied through their entire periods in hospital. They were all in infants sent to the Outpatient Department of the Children's Memorial and the Montreal General Hospitals for examination and later admission. Clinically, there was no great difference noted from the ordinary gonorrheal ophthalmia. Some of the severe cases showed a granular condition of the conjunctiva so often seen in the ordinary gonorrheal form.

Baby L., seen on March 27, 1934, twelve days old, had a history of discharge since the third day. In both eyes was a very mild ophthalmia with moderate discharge. Inclusions only were found. Patient was discharged April 18, well.

Baby J., seen May 12, 1934, three weeks old, had had a discharge from the 7th day. Both right and left eyes had a moderately severe ophthalmia, with a few gonococci and inclusions. Child was discharged May 22, well.

Baby L., seen on November 15, 1933, 21 days old, had had a discharge from the 7th day. In both eyes was a mild ophthalmia, numerous inclusions, and gonococci. Child was discharged November 28, well.

Baby L., seen November 6, 1933, 15 days old, had had a discharge from the 5th day. There was a moderately severe ophthalmia with a few gonococci and innumerable inclusions. Patient was discharged December 21, well.

Baby R., seen on May 21, 1934, had a double mild ophthalmia which had been present since the third day. Examination showed the leucocytes filled with pneumococci, and inclusions in the epithelial cells. The child was discharged on May 30, well.

Baby M., 14 days old, was seen on June 8, 1934. On the right and left was a moderate ophthalmia with considerable discharge from the left eye. Examination showed numerous inclusion bodies, which were present also on June 26. No pathogenic organisms were found. The nurse in charge maintains that the eyes had begun to discharge during the first day and had been treated with argyrol until the child's admission to the hospital.

For purposes of comparison, four cases of swimming-bath conjunctivitis have been studied. Three occurred in school children, all after using the same swimming bath, and one in an adult female. In all four, inclusions in large numbers were found over a period of some weeks. In the adult female, besides inclusions, a Streptococcus nonhemolyticus was isolated. This microorganism was also demonstrated in the conjunctival tissue. All these cases showed a trachomalike appearance, which was especially marked in the lower lids, and all were most refractory to different forms of treatment. There was no corneal involvement when ex-

amined by the slitlamp. A large number of cases of urethral gonorrhea were also examined and a number of newborn babies without conjunctivitis. An attempt was made to examine the mothers in the ophthalmia cases but this could not be arranged except in one case, which was negative. A number of cases of "wrestler's trachoma" were also examined, also innumerable cases of ordinary conjunctival inflammations, such as are characterized by the pneumococcus and Morax-Axenfeld bacillus, both very common in the Montreal area. There were also examined some cases of trachoma both with and without secondary infection.

In the examination of the 27 cases of ophthalmia the following results were obtained:

Epithelial-cell inclusions alone	8 cases
Epithelial-cell inclusions and gonococcus	8 cases
Gonococcus alone	5 cases
Epithelial-cell inclusions and streptococcus	1 case
Streptococcus or pneumococcus alone	5 cases

In two cases of gonorrheal conjunctivitis in adults, examinations were made over their entire stay in hospital. No inclusions were ever found. In the large number of urethral gonorrheal cases, no typical inclusions were ever seen except in one case where what were thought to be typical inclusions in the process of formation from phagocytosed gonococci were demonstrated to the men in the laboratory. I was never able to find this area a second time. Numerous intracellular objects were seen which resembled quite closely the inclusions of blennorrhea, but were by no means typical. A number of examinations of newborn babies' conjunctivae were negative for inclusions, as were a number of cases of "wrestler's conjunctivitis." In a large number of pneumococcal and Morax-Axenfeld cases, the results were entirely negative, as they were also in a few cases of spring catarrh. One of the last cases examined was one of chronic bilateral trachoma with a superimposed acute conjunctivitis. Typical inclusions in large numbers were found in a series of examinations. In a number of old trachoma cases, the results were negative.

The question of whether in inclusion blennorrhea we are dealing with a new clinical entity or not does not seem to me to deserve the importance given to it by some writers. In the series of cases of ophthalmia here studied, there seemed little difference in the clinical course of the cases where inclusions only were present, where gonococci and inclusions were found, or where pneumococci alone, or inclusions and streptococci were demonstrated. Variation in onset, in severity, and course occurred, but nothing definite enough in these respects to warrant any special classification.

The question of the origin of the inclusion bodies, on the other hand, seems to me to be a matter of great importance. While many authorities have followed Prowazek in regarding the elementary granules as chlamydozoa, others maintain that they are not parasites, *sui generis*, but are formed from the known pathogenic bacteria by the action of the epithelial cells. Herzog many years ago stated he believed that the inclusions were derived from the gonococcus, while Williams[12] suggested their derivation from hemoglobinophilic bacteria and the gonococcus. Ida Bengtson[13] concludes her experimental studies as follows:

> It has been possible to produce experimentally forms corresponding in appearance to the so-called elementary bodies of Prowazek, and the initial bodies of Lindner by inoculating into the conjunctiva of guineapigs certain gram-negative, rod-shaped organisms isolated from the conjunctiva of trachoma patients. A study of preparations made a *short time* (the italics are mine) after the inoculations suggest that "elementary bodies" and "initial bodies" represent modifications of the organisms originally introduced, these modifications being brought about by the action of lytic substances contained in the conjunctival fluids and tissues.

Gifford and Lazar[14] produced a conjunctivitis in animals with two chemical agents and an organism obtained from a source independent of trachoma and inclusion blennorrhea, to obtain material showing typical inclusion bodies. They state that the inclusions produced by these three agents were identical in morphology and staining reactions with

those found in trachoma and blennorrhea. The fact that such inclusions were produced by chemical agents is proof that they do not represent degenerated bacteria as suggested by Bengtson and others. The only conclusion that can be drawn from this work is that such inclusions are produced by inflammation of the conjunctiva with swelling and lymphoid hyperplasia, which would explain their occurrence in trachoma and inclusion blennorrhea without the assumption that they have any relation to a virus.

According to Stewart[15], there are three hypotheses offered to explain the nature of the Halberstaedter and Prowazek body: 1. that it is a phagocytosed granular virus, the cause of trachoma and inclusion blennorrhea (Prowazek, Lindner, Heymann); 2. that it is formed by phagocytosed bacteria which are the cause of trachoma (Herzog, Williams, Bengtson); 3. that it is formed by the phagocytosis of bacteria which are not the cause of trachoma, but which carry the virus of that disease (Stewart).

Stewart finds that inoculation of trachoma from man to man results in the development of a bacterial conjunctivitis followed by trachoma. Halberstaedter and Prowazek bodies accompany the conjunctivitis, and persist in the trachoma if the bacteria persist. Similar inoculations from man to monkey result in the development of trachoma only, as the common pathogenic bacteria of man cannot be carried to monkeys; there is consequently no initial conjunctivitis and Halberstaedter and Prowazek bodies do not appear. Stewart believes that inclusion blennorrhea is not a separate disease but is gonococcal ophthalmia with nests of phagocytosed gonococci. He states the following stages can be recognized in the development of the Halberstaedter and Prowazek bodies. The free bacterium is taken up by the epithelial cells, is cased in plastin and partially digested (initial body), groups of bacteria in the same state (fused initial bodies) coarsely granular and finely granular stages of phagocytosic digestion, Halberstaedter and Prowazek bodies with larger blue, smaller blue, and red granules; i.e., elementary granules. There is no proof that initial bodies or elementary granules multiply. Persistence of inclusions is due to persisting bacterial infection. His summary and conclusions are as follows: The pictures obtained in epithelial films leave no doubt that the Halberstaedter and Prowazek body is formed of pathogenic bacteria by the epithelial cell. The transition from free bacteria to complete inclusion can be traced. These inclusions do not occur in uncomplicated trachoma. They are found in conjunctivitis caused by the gonococcus, pneumococcus, Koch-Weeks, diplobaccillus of Morax-Axenfeld, Streptococcus haemolyticus. He concludes that, 1. in trachoma the finding of Halberstaedter and Prowazek bodies is due to the frequent secondary bacterial infection of this disease; 2. inclusion blennorrhea of the newborn and of older children and of adults has no existence as a separate disease. It consists of a heterogeneous collection of cases of bacterial conjunctivitis in which phagocytosis by the epithelial cells has been demonstrated. The apparent occurrence of pure cases of inclusion blennorrhea, that is conjunctivitis with inclusions but without pathogenic bacteria, is due to the admitted difficulty of proving the presence of the latter in all cases; 3. the nature and etiology of swimming-bath conjunctivitis is doubtful. Inclusions found in it are probably due to the Koch-Weeks bacillus or other bacteria. The presence of chlamydozoa has been reported as occurring in follicular conjunctivitis, spring catarrh, diplobacillary conjunctivitis, and on the normal conjunctiva.

Axenfeld stated his scepticism of some of these observations and rightly so, I think. He considered that they cannot be considered as artefacts or degenerated bacteria. After review of all the evidence, Axenfeld considered in 1914 that the inclusion bodies of Halberstaedter and Prowazek must in all probability be considered as representing a living parasite, and that they are morphologically identical with those found in inclusion blennorrhea, but that the identity of the agent in the two diseases cannot be considered as settled.

Thygeson, before the recent meeting of the Association for Research in Ophthalmology, took up the question of the etiology of inclusion blennorrhea from a study of eleven cases. He believes that the elementary and the initial bodies constitute the etiological agent of inclusion blennorrhea. (See Amer. Jour. Ophth., v. 17, no. 11, p. 1019.) It is clear, says Thygeson, that an intracellular development from initial bodies to elementary bodies takes place. The initial-body type is composed of large coccoid or coccobacillary bodies, the initial bodies, which take a deep-blue stain with Giemsa. Typically, the inclusions cover the nucleus like a cap, but isolated inclusions are not rare. Multiple inclusions in a cell appear frequently. In inclusions of intermediate size, there is evidence of the multiplication of the initial bodies which are smaller and often densely packed, forming a sort of "mulberry mass." In the largest inclusions, the fine granules, elementary bodies, may be clearly resolved. While the early and intermediate types of inclusions, when few in number, may be confused with nonspecific bodies, the elementary-body inclusion is absolutely typical and cannot be confused with artefacts. Thygeson on the life cycle states: 1. a free elementary body penetrates an epithelial cell and because of satisfactory nutrition obtainable; 2. develops into an initial body; 3. the initial body then divides, becoming progressively smaller in size until; 4. the elementary body stage is reached. The cell is now weakened because of cytoplasmic substance and 5. ruptures either spontaneously or because of pressure occurring during the movement of the lid with consequent scattering of the elementary bodies into the secretion.

Lindner, on the other hand, considered the initial-body stage the infective one.

Three complete cycles from elementary body to elementary body were observed by Thygeson during the first six days after inoculation. This, he suggests, indicates that the life cycle of inclusion-blennorrhea virus is approximately 48 hours. It is interesting that this figure agrees with that determined by Bedson for the life cycle of the psittacosis virus. Thygeson found two types of adult inclusion infection. In one there is a papillary conjunctivitis with acute or subacute inflammatory symptoms, much secretion and fairly numerous inclusions. Follicles are either absent or masked by a papillary hypertrophy. In the second type, the more common, the picture is of a chronic follicular conjunctivitis without much secretion or inflammation. Inclusions are found only during the first few weeks and are few in number. Since the inclusion-blennorrhea virus shares with other viruses the common properties of (1) filterability, cytotropism (inability to multiply in the absence of living cells) and (2) inclusion formation, it should be classed with other viruses of large-particle size, such as the viruses of vaccinia, fowlpox, molluscum contagiosum, and psittacosis.

That the chlamydozoan is a living organism is recognized by many authors; others, however, maintain the opposite view. According to Flemming[16] it is a harmless saprophyte, while Löhlein[17], Heymann, and Lumbroso believe it to be the cause of only one disease, inclusion blennorrhea. Its presence in trachoma they regard as a side issue. It is a virus of genital origin, which causes the various inclusion diseases, according to Lindner[18] and Wolfrum. Comberg[19] believes that inclusion blennorrhea and trachoma are caused by one and the same chlamydozoan, but that the inclusion of swimming-bath conjunctivitis is different biologically. The chlamydozoa are simply gonococci with changed biological conduct, according to Herzog and Fodor[19a]. The elementary bodies and the initial bodies are modifications of the Bacillus granulosis, the changes being caused by the lytic substances of the conjunctiva (Bengtson). The chlamydozoan of trachoma is morphologically identical but biologically different from that of inclusion blennorrhea and swimming-bath conjunctivitis (Botteri[20], Wakisaka[21], Rötth, Oguchi[22], Aust[23], Lindner, Löwenstein[24], Taboriski[25]).

Our knowledge of the biology of inclusion bodies is scanty and their ex-

planation is limited to clinical and theoretical considerations. The identity of the inclusion elements found in trachoma, inclusion blennorrhea, and swimming-bath conjunctivitis is not yet satisfactorily answered and stands in the center of very lively discussions. On one side, it is maintained by Lindner that the inclusion formations of trachoma and blennorrhea are identical. He is of the opinion that trachoma is

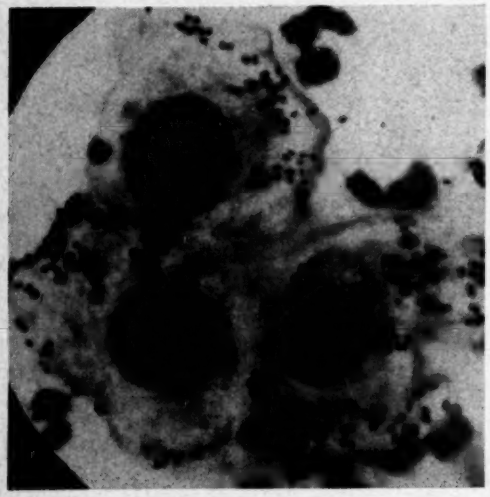

Fig. 2 (McKee). Gonococci lying on the surface of an epithelial cell.

originally a purely genital infection, whose virus in the course of years in individual strains is transmitted to the eye and is then transplanted from eye to eye. Some of these strains he thinks have been extinguished after longer or shorter duration, while the others, being transmitted continually from eye to eye, have adapted themselves to the new conditions and have become more chronic and obdurate than those strains which came freshly from the genital apparatus and which happened to get into the eye.

This opinion has met with much opposition from Heymann, Löhlein, Gebb[26], and Oguchi, who, on the basis of clinical and experimental experience, believe that while they may be morphologically similar, biologically the inclusions are different.

In seeking the etiology of the epithelial-cell inclusion, it seems to me we should not overlook the known facts concerning the action of the conjunctival epithelial cells on conjunctival bacteria. In 1912, the writer[27] advised the use of the epithelial-cell smear in the study of gonorrheal cases. By this method, the study of conjunctival inflammation has shown that, in an infection, microorganisms may be free, they may lie as parasites on the epithelial cells, or may be found in the mucosa. In the defense of the conjunctiva the polymorphonuclear leucocytes form the first line. They pass through the epithelium from the dilated superficial blood vessels, and after encountering the bacteria, are got rid of in the purulent discharge. The epithelial cells deal with the bacteria which survive in the mucosa after the acute inflammation has subsided. Pathogenic microorganisms come in touch with the epithelial cells in the first instance by growing freely on their surface, but when the defensive level reaches a certain height, the epithelial cells engulf the bacteria and destroy them. This process of phagocytosis by the epithelial cells is well seen in the ophthalmias of the newborn. Digestion of the bacteria proceeds when the latter lose their outline and appear as blue-staining bodies of various shapes and sizes according to the number of microorganisms involved. It has been definitely established that the epithelial cells are active phagocytes, for microorganisms, parts of broken down cells, nuclei, nucleoli, and inorganic particles are often seen within the cell cytoplasm.

The study of the inclusions of inclusion blennorrhea should be closely associated with the study of the inclusions of swimming-bath conjunctivitis and trachoma. In connection with the latter the following report of Stewart seems to me striking: In 84 cases of trachoma in which secondary bacterial infection was not evident, only 2 showed the Halberstaedter and Prowazek bodies. Of these two, one was closely associated in her home with a child suffering from acute Koch-Weeks conjunctivitis, while the other had two inclusions obviously composed of half digested bacilli. We are therefore justi-

fied in saying that in 82 cases of pure trachoma, none presented the Halberstaedter and Prowazek bodies, while in 140 cases with bacterial infection, 26.5 percent showed these bodies. The Halberstaedter and Prowazek body is therefore associated not with trachoma, but with bacterial conjunctivitis. There are numerous enclosures found in the epithelial cells, which may simulate inclusions. Red blood corpuscles, polymorphonuclear leucocytes, eosinophile leucocytes, basophile leucocytes, nuclear parts from other cells and microorganisms are not infrequently found, while changes in the epithelial cell itself, such as nuclear debris, protoplasmic thickening, exploded nuclei, mucous degeneration, displaced pigment, hyaline and amyloid degeneration, vacuolar degeneration, and invaded nucleoli, may complicate the picture.

It is necessary, therefore, that we be most meticulous both in the preparation of the smear and the subsequent staining in order to avoid mistakes and false conclusions. In the first place, we should be most clear as to what we understand by the Halberstaedter and Prowazek bodies. Misunderstanding of this has, I think, given rise to wrong deductions. The Halberstaedter and Prowazek bodies are a formation in the protoplasm of the conjunctival epithelium and are sharply demarcated. They are small or large, round or oval or half-moon bodies, which sometimes fill out the whole protoplasm, but mostly appear related to the cell nucleus, covering it like a cap. With Giemsa, the inclusion is stained a deep blue or violet. The larger coccuslike ingredients, the so-called initial bodies, are always blue, while the smaller so-called elementary bodies are stained a pale violet or pink. The form and size of the initial bodies show considerable variation; the elementary bodies also show now and then a uniformly rounded, sometimes longer, or doubled, or handle-formed shape. The larger Halberstaedter and Prowazek bodies are homogeneous only if excessively stained, and in such cases they are dark blue or violet. If properly stained, there is always to be seen a graining of the body, and this, according to some, is one of its most important and characteristic qualities. The small, more removed inclusions are generally constituted from several initial bodies which may be of various sizes, and these small inclusions are generally surrounded by a very fine white halo. The smaller inclusions have now and then a longish stretched form, probably due to the preparation of the smear. The small inclusions can now and then consist in whole or in part of a barrellike or ring shape, corresponding to Lindner's free initial bodies. The larger caplike inclusions are blue, blue violet, or pure violet in color. In general, the graining of these is much easier to see, and the violet tint more accentuated, the larger and looser they are. Frequently, a part of the inclusion is still bluish, although its granulations are hardly to be noticed, while other and looser parts have an emphatic violet color. The largest, which fill out the whole protoplasm, consist mainly of small, round, double-handlelike grains, also there are now and then individual, larger, blue-stained ones to be found. The inclusions always stain differently from the nucleus, and are never bright red. With good staining they are never homogeneous, and "occur only in the epithelial cells." The latter are mostly healthy and the nucleus and that of the inclusion have not taken up the protoplasm, but are just like those in the sound adjacent epithelial cells. Now and then one observes vacuole degeneration, which can also be seen in adjacent cells. With good staining the chromatin network will be seen through the inclusion bodies. The shape of the inclusion is a bit different by Lindner's contrast stain, and this is accentuated in the blue-stained bodies. The picture is even more changed by moist fixation. In this process it is seen that the inclusions lie in a cavity, and the initial bodies are situated on the inner wall of the cavity, each separately and not confluent with one another. The relationship between the two formations, initial and elementary bodies, can be best studied with the Giemsa stain.

The literature on the etiology of the inclusion diseases—trachoma, inclusion

blennorrhea, and swimming-bath conjunctivitis—is filled with empirical statements, given without much reason in some cases, for this or that opinion of the writer. One believes swimming-bath conjunctivitis a single clinical entity, the next one confirms the finding of some one else who sharply distinguishes inclusion blennorrhea and swimming-bath conjunctivitis from trachoma. After a prolonged study of the inclusions of these diseases, with special notation of the similarity of the initial bodies, elementary bodies, and chlamydozoa in all three, one wonders upon what grounds the statements are made, that while morphologically they are similar, biologically they are different. I believe that when the etiology of one has been solved, they all will have been. My study, finished before I had seen Stewart's report, has led me to conclusions similar to his; namely, that the inclusion is formed by phago-

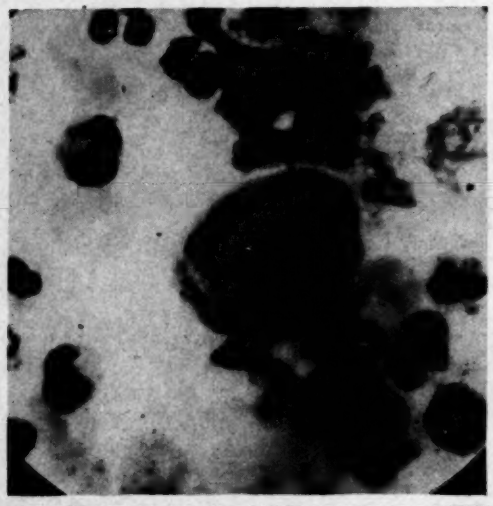

Fig. B

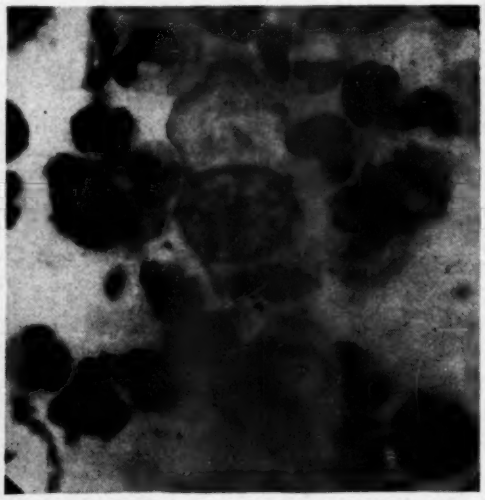

Fig. 3

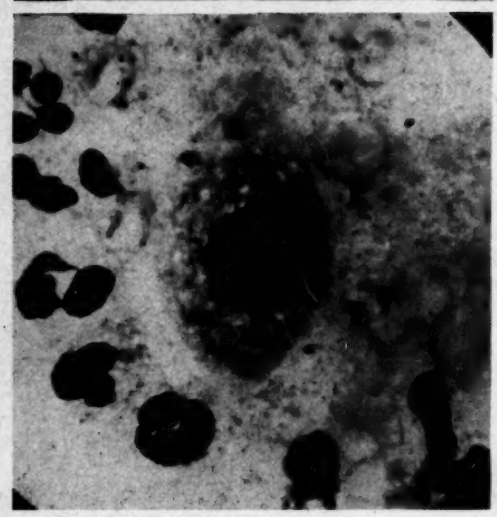

Fig. 4

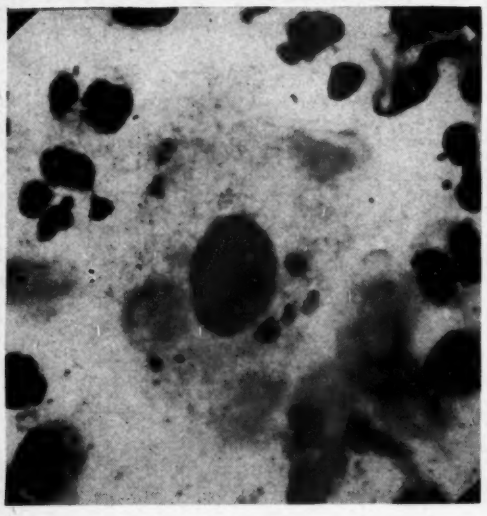

Fig. 5

Fig. B (McKee). Two inclusions in a lymphocyte.

Fig. 3 (McKee). Gonococci grouping near the nucleus of the cell, somewhat similar to inclusion body.

Fig. 4 (McKee). Initial bodies? Gonococci grouped very similarly to initial bodies.

Fig. 5 (McKee). Continuation of grouping of gonococci (inclusion bodies).

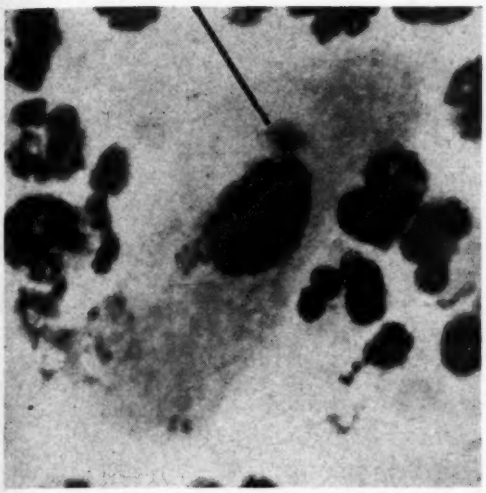

Fig. 6 (McKee). Epithelial cell with gonococci and an inclusion which shows diplococci partly disintegrated.

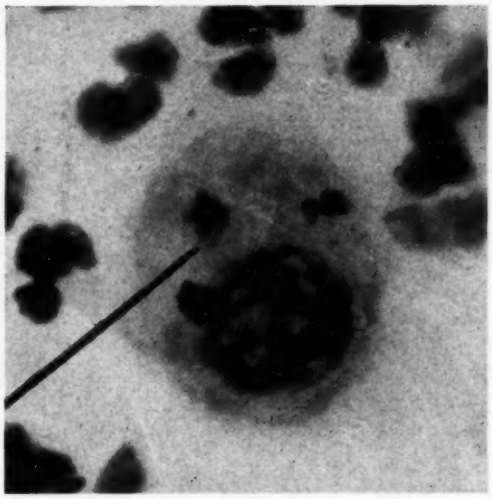

Fig. 7 (McKee). Epithelial cell with clusters of gonococci, somewhat suggesting a stage in which small cocci form before these break up into the granules composing the inclusion body.

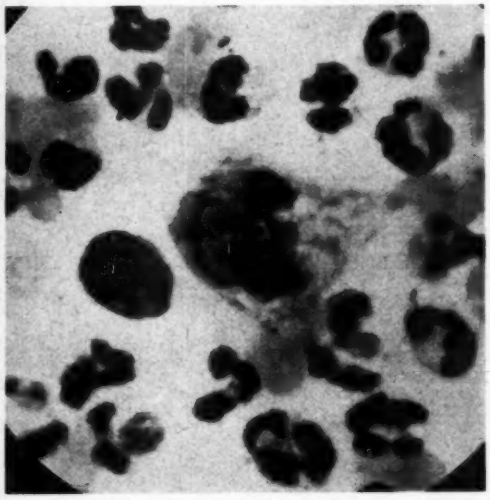

Fig. 8 (McKee). Further grouping of gonococci, giving an appearance similar to inclusion bodies.

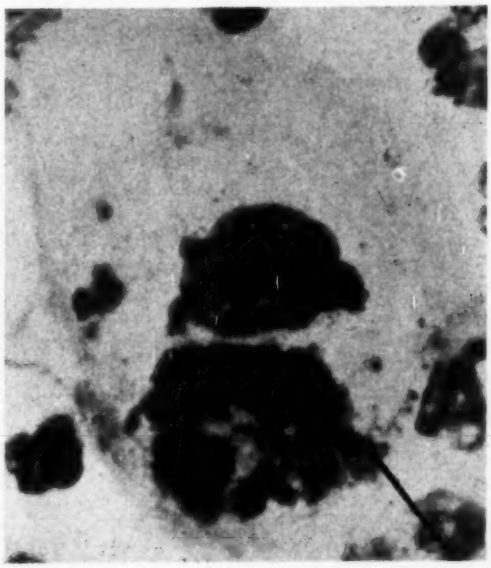

Fig. 9 (McKee). Inclusion mass with gonococci. Note coccoid forms in the inclusion body at its right lower point.

cytosis of bacteria which are not the cause of these diseases, but which carry the viruses.

In inclusion blennorrhea one finds pathogenic bacteria on the surface of the epithelial cells, where they either multiply or are destroyed by the cells according to the lowered or raised resistance of the individual. According to Stewart if only a few bacteria are involved, we find bodies of 1-2 μ in diameter, of the size of a coccus, the initial bodies of Lindner. If a large number have been growing on the cell, we

see a larger mass—fused initial bodies. Digestion of the bacteria proceeds, and the mass resolves itself into a vacuole containing blue bodies of an irregular shape. Coccoid forms now appear, the elementary granules. In certain cells, gonococci clusters are seen with the suggestion of a stage of cocci formation, before they break up into the granules. The cocci then become disintegrated, and are formed into the mantle protozoa.

These conclusions are made from an intensive study of hundreds of slides taken from a few cases. In this connection corroboration of Thygeson's report will be awaited with great interest. If it can be demonstrated, as he claims, that the filtrable virus of the elementary bodies is the etiological factor in inclusion blennorrhea, then the long-sought solution of the trachoma mystery is at hand. No clinical entity due to an inclusion infection is recognized as yet by the urologist or gynecologist. It may seem a far cry from inclusion blennorrhea—an acute, benign inflammatory process of the conjunctiva—to trachoma—a chronic low-grade inflammation with its characteristic complications and sequelae—but many years ago Arlt, on the basis of clinical observations, asserted that trachoma was ultimately derived from acute blennorrhea.

1528 Crescent Street.

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HYPERPLASIA OF THE COVERING EPITHELIUM OF THE TARSAL CONJUNCTIVA IN TRACHOMA

HARVEY D. LAMB, M.D.
SAINT LOUIS

Pronounced degrees of hyperplasia of the epithelium, covering the conjunctiva of the tarsus were described in the case of four typical tarsi, removed from patients with long-standing trachoma. The four specimens were chosen from a collection of about thirty trachomatous tarsi. Brief descriptions of the excised tissue in these four cases were arranged in stages from that of cellular infiltration through the cicatricial stage. The conclusion seems justified that intensive degrees of epithelial proliferation in trachoma are not exceptional, if the process is not too old. From the Oscar Johnson Institute, Washington University School of Medicine, Saint Louis, Missouri. This research was conducted under a grant from the Commonwealth Fund of New York City.

It is generally recognized that in all chronic inflammations of the skin or mucous membranes, there commonly occurs a more or less pronounced proliferation of the covering epithelium. The greatest of all authorities on the histology of inflammation, Felix Marchand[1], in 1924 reviewed the modern knowledge of this subject. He stated that the irregular and frequently deeply descending and branching sprouts and processes from the covering epithelium of inflammatorily changed skin or mucous membrane is entirely dependent upon the production of inflammatory connective tissue. This new-formed connective tissue is less resistant to the ingrowth of the covering epithelium. The latter always takes place in the direction of least resistance. There is no doubt that in the skin or mucous membrane, the covering epithelium and the underlying connective tissue belong inseparably together, both biologically and pathologically. In chronic inflammations, therefore, the proliferation of the underlying connective tissue would naturally be secondarily accompanied by a hyperplasia of the covering epithelium of the skin or of a mucous membrane. In trachoma, where there is usually present a large amount of new-formed connective tissue, it is accordingly not surprising to observe a considerable hyperplasia of the overlying epithelium.

Löhlein[2], in 1928, wrote that in trachoma with hypertrophy of the papillary body, the epithelial covering is naturally considerably enlarged. The latter consists in a true increase in the number of epithelial cells, for the primary covering epithelium was found not thinned but thickened over the summits of the papillae, in spite of the much greater expansion of the epithelial layer. A pronounced hyperplasia of the epithelium was demonstrated by the formation of epithelial sprouts and tubules, arising from the valleys between the papillae and from the walls of the papillae. According to this author, all these changes in the epithelium, however, could be observed in the most diverse chronic inflammatory processes of the conjunctiva.

Lindner[3] stated in 1929 that trachoma belongs to the infectious, secreting conjunctivitides, in which a toxic agent acts upon the entire epithelial layer. The long-continued action of such an agent always leads to a papillary hypertrophy of the tarsal conjunctiva. Lindner quoted Axenfeld as once using the expression "epitheliosis" to designate the involvement of the epithelial layer in trachoma.

Taborisky[4] observed in cases of trachoma, as early as the second day of the disease, many interpapillary downgrowths from the covering epithelium of the conjunctiva in the fornices. After the third month, the number of the downgrowths gradually diminished. In folliculosis and follicular catarrh, the hyperplasia of the conjunctival epithelium was much more uniform, leading to the formation of papillae, furrows, and tubular depressions from the surface; solid proliferation of the epithelium into the depth of the tissue was very rare. Taborisky emphasized also an early characteristic change in the stratified columnar epithelium of the

palpebral conjunctiva in trachoma; namely, an alteration to a stratified squamous-celled type of covering.

Whereas Marchand assigned a secondary role to the epithelial proliferation in chronic inflammations of the mucous membranes, Lindner and Taborisky considered that the overlying epithelium of the tarsal conjunctiva is primarily stimulated by the "toxin" of trachoma. Although in Löhlein's opinion a true epithelial hyperplasia is present in trachoma, he does not think it specific of trachoma.

The material used in the present study of the proliferation of the epithelium of the tarsal conjunctiva consisted of excised tarsi with their covering conjunctivae from the upper eyelids of patients with trachoma. During the last twelve years, about twenty such specimens have been sent to us for examination from the U. S. Public Health Service Hospital for Trachoma at Rolla, Missouri, through the courtesy of Dr. Paul D. Mossman and Dr. C. E. Rice. In addition, about ten more tarsi have been received from ophthalmologists in St. Louis. Tarsectomy has therefore been but an infrequent operation for trachoma in Missouri. In eight of the tarsi, a pronounced proliferation of the covering epithelium was present. A description of the four most typical was chosen for the present report. In practically all but the eight cases mentioned, contraction of the new-formed cicatricial tissue had proceeded so far as to destroy all but the covering epithelium and even the latter, loosened by the accompanying edema, had usually desquamated completely.

Histories of the patients from whom this material was derived are not included because in all there was an old trachoma of years' standing. Histories from these primitive people, living in the Ozark hills, are inaccurate, partly because people take the effects of trachoma rather as a matter of course and little short of total blindness makes any impression on them. The great majority of them have no conception within years as to how long the trachoma has existed.

The excised tarsi were fixed in formalin, imbedded in paraffin, and sections parallel to the lid-margin made; the sections were colored in hematoxylin-eosin and in a few instances in van Gieson's stain for differentiating connective tissue.

Example of a well-advanced epithelial hyperplasia with dense cellular infiltration. Specimen 781. Many narrow papillae and many narrow tubular downgrowths from the covering epithelium were present leading to the formation of numerous cystic cavities deep in the greatly thickened conjunctiva.

No uniform transformation of the stratified columnar to a typical stratified squamous-celled epithelium was observed. Over the papillae, all the cells in the three or four layers of the epithelium were generally flattened in a greatly varying degree. Between the papillae, the much thicker epithelium was composed generally of cylindric cells with two or three superficial layers composed of cells, likewise unequally flattened. Columnar cells generally formed the lining of the tubular depressions and of the terminal cystic spaces deep in the infiltrated conjunctiva. The interior of the cysts contained in many instances a little granular detritus, many pus cells, and a few large mononuclear cells. Here and there in both the covering epithelium and in the downgrowths, the epithelial cells showed pyknosis, which had caused the nuclei to be shrunken, dark stained, and surrounded by a thin annular vacuole. Cystic degeneration was fairly common in the cytoplasm of the epithelial cells lying deeply in the downgrowths. In the latter position, a scanty infiltration with pus cells was observed.

The infiltrating cells in the conjunctiva were diffusely arranged; they consisted almost entirely of plasma cells, but a few small lymphocytes, epithelioid, and pus cells were found. Many small congested capillaries were present in the infiltrated conjunctiva, particularly in the papillae.

The connective tissue of the tarsus presented an increased number of capillaries with proliferated endothelial and plasma cells in apposition to many of them. Numerous young fibroblasts were

diffusely scattered throughout the tarsus, indicating a definite involvement of the tarsus in the trachomatous process. The meibomian glands were apparently but little disturbed.

Example of an intensive degree of epithelial hyperplasia with mild cellular infiltration. Specimen 1096 (figs. 1 and 2). A great number of narrow, solid, and tubular epithelial downgrowths with much papillary hypertrophy was observed. The conjunctiva was considerably thickened and consisted of a very edematous, loose-meshed connective tissue, containing a great number of capillaries, and mildly infiltrated in a diffuse manner with small lymphocytes and plasma cells; deeply lying in the edematous conjunctiva, there was observed a small number of pus cells. The covering epithelium generally had been changed to a stratified squamous-celled type. The solid and tubular downgrowths were generally composed superficially of columnar cells whose long axes were arranged at right angles to the surface of the conjunctiva; deeper, the solid downgrowths were constituted of polyhedral cells, except for an outer, enclosing cuboidal or columnar-celled layer. The deeper parts of the tubular downgrowths were generally composed of a lining of stratified columnar epithelium. Many of the flattened and polyhedral-shaped cells, lying superficially, showed nuclei which were considerably shrunken. Thin layers of edematous fluid generally lay between the polyhedral and columnar cells near the surface of the conjunctiva; fine intercellular bridges were frequently observed. The polyhedral cells lying deeply in the solid downgrowths presented much cystic and hyaline degeneration of the cytoplasm. The columnar cells lining the deeper parts of the tubular downgrowths frequently showed mucoid degeneration and the formation of goblet cells. The deeply lying parts of the downgrowths were generally infiltrated with a few pus cells. Where the papillary hypertrophy was intensive, some of the secondarily developed tubular downgrowths of moderate depth showed much lateral and deep branching into tubular or solid extensions. These lateral extensions frequently became continuous with other solid downgrowths, extending inwards from the surface epithelium.

Fig. 1 (Lamb). Specimen 1096. Section through tarsal conjunctiva, showing irregular papillary hypertrophy and numerous solid and tubular epithelial downgrowths, many with deep branching.

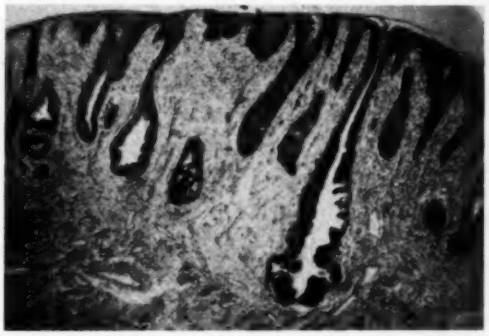

Fig. 2 (Lamb). Specimen 1096. Section through tarsal conjunctiva, considerably swollen with edematous fluid, showing short solid and long tubular downgrowths from the covering epithelium.

The underlying tarsus was involved to an even greater degree than in the previous case. Many more small capillaries with large groups of proliferated endothelial and plasma cells around them were observed. The tarsal connective tissue was also moderately edematous. The meibomian glands were apparently normal.

Example of an intensive degree of epithelial hyperplasia with a mild degree of cellular infiltration, associated with considerable cicatrization. Specimen No. 485 (fig. 3). An extensive

branching of narrow, solid and tubular downgrowths from the covering epithelium formed a network, whose meshes surrounded various - sized islands which contained considerable new-formed connective tissue with a few young fibroblasts, small capillaries and a few plasma cells. The covering epithelium had been generally changed

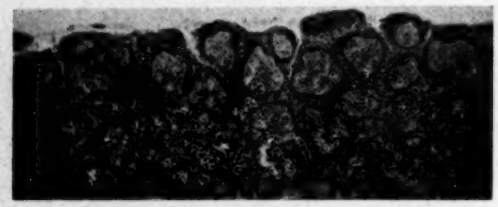

Fig. 3 (Lamb). Specimen 485. Section through tarsal conjunctiva, showing epithelial networks, enclosing islands, composed principally of new-formed connective tissue.

to a stratified squamous-celled variety. The solid downgrowths as a rule were composed of polyhedral-shaped cells except for a single outer layer of cuboidal cells. The lining cells of the tubular downgrowths were generally somewhat flattened, although in places, except for one or two inner-lying layers of flattened cells, the remainder might be polyhedral shaped, particularly near the surface of the conjunctiva. Mild degrees of pyknosis were common, both among the cells in the covering epithelium and in the downgrowths. Very thin layers of edematous fluid lay as a rule between adjoining epithelial cells.

The tarsus contained a large number of small capillaries with small groups of plasma cells in proximity to many of them. New-formed cicatricial tissue had greatly thickened the tarsus and caused an atrophy and destruction of the acini of the meibomian glands throughout their length. To the anterior side of the remaining meibomian-gland acini, there were observed several small collections of fat cells.

Example of an intensive and prolonged cicatrization over a previous epithelial hyperplasia of the covering conjunctiva. Specimen No. 346 (fig. 4). Lying deeply beneath a thick mass of cicatricial tissue, tubular downgrowths of the covering epithelium were observed. The new-formed layer of dense, cicatricial tissue in the conjunctiva varied considerably in thickness.

The surface epithelium on the conjunctiva had almost entirely disappeared. The tubular epithelial downgrowths opened at several places to the inner conjunctival surface. The epithelial cells in the downgrowths showed generally much cystic degeneration of cytoplasm with considerable resultant separation of the individual cells. The cicatricial tissue of the conjunctiva contained numerous young and mature fibroblasts and small capillaries, around some of which were small collections of macrophages, proliferated endothelial and plasma cells.

The connective tissue of the tarsus contained an increased number of capillaries with proliferation of the endothelial lining of many of them. The acini of the meibomian glands were generally smaller than normal, due to atrophy.

It is not possible for the writer to state, whether intensive degrees of epithelial hyperplasia, similar to those here described in trachoma, occur in

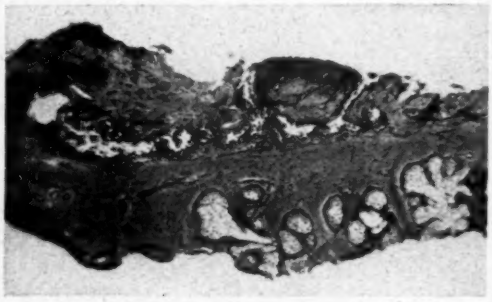

Fig. 4 (Lamb). Specimen 346. Section through part of tarsus and cicatricial covering conjunctiva, showing buried epithelial processes under the cicatricial tissue of the conjunctiva.

other chronic inflammations of the conjunctiva, such as follicular conjunctivitis, vernal catarrh, pemphigus, etc., because there has been little opportunity to obtain tissue from these conditions. Neither in the literature, were any but meager detailed descriptions found of the amount of epithelial hyperplasia present in these conditions, in-

cluding that in trachoma. Attention is called again to Taborisky's[4] findings mentioned above, regarding the comparatively slight degree of epithelial hyperplasia in follicular conjunctivitis and its much milder intensity in trachoma than is reported in this paper.

640 South Kingshighway.

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EYESOCKET RECONSTRUCTION NECESSITATED BY EXTRAOCULAR MYOSITIS ASSOCIATED WITH THYROID DISEASE

GERALD BROWN O'CONNOR, M.D., AND GEORGE WARREN PIERCE, M.D.

SAN FRANCISCO

The authors report a case of extraocular myositis associated with thyroid disease. Following the enucleation of an eye, due to a laceration, myositis was found in the process of an eyesocket reconstruction. The presence of the soft, bulky, postconjunctival tumor in a patient presenting a history of toxic thyroiditis with mild exophthalmus relieved by two thyroidectomies, pointed to the diagnosis. The gross and microscopical findings substantiate the work of Naffziger and associates on this subject. The postoperative results demonstrates the feasibility of excising benign postconjunctival masses and of obtaining a well-functioning eyesocket.

Following the loss of an eye by disease, trauma, or operation, the eyesocket in many instances, requires reconstruction on account of loss or distortion of its lining membrane, the conjunctiva. Occasionally the situation is complicated by such rare conditions as postconjunctival tumors, foreign bodies, cicatricial accumulations, and extrinsic-eye-muscle hypertrophy, which, by their mere bulk, render the socket incapable of carrying a glass prosthesis.

Case report. G. H., aged 60 years, a blacksmith, was referred by Dr. Emmens of Medford, Oregon, in August, 1933, because of inability to retain a prosthesis in the right orbit following removal of the eye by enucleation.

On May 24, 1933, a sliver of steel had struck the patient's right eye while he was cutting off a rivet. Ten days later, on account of the injury and subsequent infection, it was necessary to remove the eye. Following enucleation the patient was unable to retain a glass prosthesis.

His past history was essentially negative, except that he had undergone a thyroid operation in March, 1925. The patient stated that his symptoms at that time were weakness, nervousness, palpitation, excessive sweating, tremor, and loss of weight; also that his eyes started to bulge considerably. Following a thyroidectomy all of his symptoms either disappeared completely or were markedly improved, including a retrogression of the bulging eyes. After two years he gradually developed a recurrence of the above symptoms with the return of the protrusion of the eyes. The thyroid gland was again operated on in March, 1927, by the same physicians. Since that time the patient had had no return of his previous symptoms; the eye protrusion had decreased and he had been able to carry on his usual duties, those of a blacksmith. He gave no history of blindness nor eye trouble outside of the protrusion that he noticed at the time of the over-activity of the thyroid gland, and some slight dimming of the vision in the last few years.

Examination of the right orbit. The upper and lower lids were normal, ex-

cept for slight scar at the outer canthus. The eye had been enucleated and the mucosa was moderately inflamed and edematous, and protruded more than normal because of a soft bulky mass behind it. There was a slight proptosis of the other eye. At operation under ether anesthesia, through a transverse conjunctival incision, the bulky mass was exposed. It proved to be hypertrophied, extrinsic eye muscle filling about three fourths of the orbital cavity. The muscles were firm, distinct, easily separable, edematous, pale, and about five times the normal size. Some scar and periorbital fat were present but negligible in amount. The scar, fat, and sufficient extrinsic-eye-muscle tissue were excised to enlarge the socket for a future glass prosthesis.

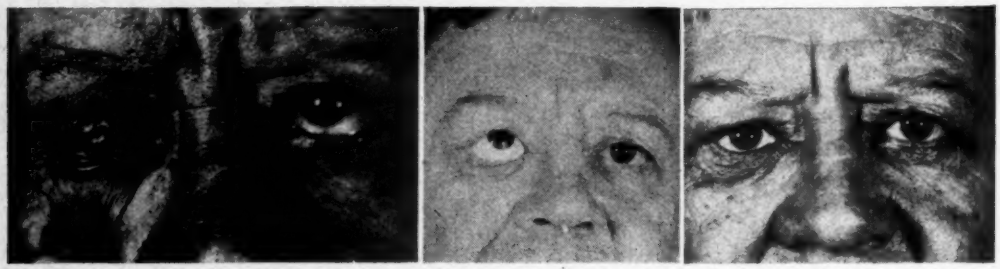

Fig. 1 (*left*) (O'Connor and Pierce). Prolapse of conjunctiva on account of soft bulky post conjunctival mass partially filling orbital cavity (Aug. 15, 1933).
Fig. 2 (*center*) (O'Connor and Pierce). Glass eye in position, showing marked protrusion before operation (Sept. 5, 1933).
Fig. 3 (*right*) (O'Connor and Pierce). Final result. Note normal upper-lid contour (Sept. 18, 1933).

The pathological report on the excised material was as follows:

Gross description. The specimens consist of small pieces of scar, adipose tissue, and two irregular pieces of muscle and surrounding fascia. The larger specimen reveals a rather edematous muscle almost entirely covered by connective tissue. The smaller specimen is a fragment of similar muscle.

Microscopic. The section shows skeletal muscle in which the fibers are widely separated. Some fibers are normal in appearance, others show a very faint granular cytoplasm, and still others are edematous, deeply stained, and have undergone a hyaline degeneration. A large zone of dense fibrous tissue, hyaline in some portions, has apparently replaced the skeletal muscle. Several collections of round cells, often related to small vessels, appear to be undifferentiated mesenchymal cells rather than lymphocytes. In the fibrous tissue are many small vascular channels and these all show a small cuff of rather similar cells, which may be lymphocytes.

Diagnosis. Chronic myositis and degeneration of extraocular muscles.

In the last few years, since the epoch-making work of H. C. Naffziger[1] and his associates, considerable attention has been focused on the pathological changes in the extraocular eye muscles associated with thyroid disease. They[2] have reported six cases of progressive exophthalmos following thyroidectomy, requiring intracranial orbital decompression. The gross and microscopic appearances of the muscle biopsies in these cases are essentially the same as those seen in the case reported above[3]. The muscle degeneration and hypertrophy in our case, however, was not so extreme as in Naffziger's cases. Naffziger[4] made a very comprehensive and exhaustive survey of the literature, and, in reviewing his articles, one finds that numerous observers have recorded large extraocular muscles with or without pathological reports in a wide variety of conditions. However, Naffziger was unable to find any reports describing extraocular hypertrophy and myositis in progressive exophthalmos associated with thyroid disease.

One cannot make any sweeping con-

clusions from one case, but to us it is quite plausible that definite changes take place in the extraocular muscle of every person with a hyperthyroid condition; the degree of muscle degeneration and hypertrophy determining the existence and degree of exophthalmos.

The gross and microscopic findings in the extraocular muscle in our case corroborated the recent and comprehensive work of Naffziger and his associates. Because of the dearth of available information on this important subject we present this case report with the hope that it will stimulate further investigation directed towards this particular phase of thyroid disease, and in order to demonstrate that eyesocket reconstruction is quite feasible in certain types of postconjunctival accumulations.

490 Post Street.

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NOTES, CASES, INSTRUMENTS

THE USE OF COPPER IONIZATION IN THE TREATMENT OF CHRONIC STENOSIS OF THE LACHRYMAL DUCT

H. L. Hilgartner, Jr., M.D., and H. L. Hilgartner, Sr., M.D., F.A.C.S.
AUSTIN, TEXAS

The patient, a doctor 68 years old, had been troubled for years with tearing in the left eye. He had had numerous treatments in the past with probings and irrigations, that gave only temporary relief. He does not know what caused the condition, and, as far as he knows, he has never had any acute infections about the nose or eye.

A No. 1 Theobald probe could not be passed through the left lachrymal duct. On the 16th of September, 1933, with great difficulty, this probe was passed into the nose. The procedure was repeated daily for several weeks. On the 21st of December the lachrymal canaliculus was slit. Dilatations were continued at intervals with irrigations, but these gave no permanent relief.

On the 15th of March we decided to try a new procedure. A copper wire, the same size as a No. 3 Theobald probe, was passed through the lachrymal canal into the nose. A galvanic current of 4 milliamperes was then turned on. This was continued for twenty minutes. The current was supplied by nine dry cells with the negative pole connected to the copper wire, the positive pole being the indifferent electrode. The patient was only slightly uncomfortable during the treatment but experienced a severe reaction afterwards causing headache and pain for eight hours. On the following day the canal was irrigated with two percent boric acid solution. The irrigating fluid passed freely into the nose.

The patient was again seen on the 20th of March at which time another irrigation was done, the fluid passing freely into the nose. The tearing had ceased entirely, and no discomfort was felt. The patient has been kept under observation and was last seen on October 7th. There has been no return of symptoms and a No. 3 Theobald probe passed easily into the nose.

209 Norwood Building.

SUBCONJUNCTIVAL INJECTIONS OF ADRENALIN IN VENOUS THROMBOSIS

Henry N. Blum, M.D.
NEW ORLEANS

In January, 1925, Mr. S. A., a resident of Spanish Honduras, came to the office because of glaucoma in his left eye. The details of the fundus could be seen only indistinctly, but the impression was that there was a thrombosis of the central retinal vein which was causing the glaucoma in this eye. The media were not clear and consequently it was difficult to obtain a completely satisfactory view of the eye grounds.

His symptoms became aggravated from day to day, the eyeball more injected, and finally after several days, the blood vessels of the iris were so engorged that the normally brown iris looked like burnished copper. It was now impossible to see the fundus. A subconjunctival injection of several drops of adrenalin chloride solution, 1/1,000, caused intense agony; the pupil dilated, and the tension became higher. It was necessary to give morphia hypodermatically to relieve the pain. A week later, however, the blood vessels of the iris could no longer be seen and the fundus could be seen indistinctly, the pain had disappeared, the intraocular tension had been reduced to normal or thereabouts. The patient left for a week's vacation in the country, after which he was seen no more. There is reason to believe that he was permanently relieved of his glaucoma.

The second patient, Mr. E. A., fifty years of age, came to the office April 6, 1934. About a week previously he had noticed failing sight in the left eye and had gone to a local hospital where he was given a card showing the diagnosis to be hemorrhage in the retina of the left eye. He presented this card at the time of the first visit to my office. The

left eye was his better eye, the right having been amblyopic from strabismus in childhood.

There was no doubt that he had a central venous thrombosis of the left eye. The optic nerve was very hyperemic, the retinal vessels enormously dilated, with hemorrhages scattered throughout the retina, many being located in the macular region. The patient was taking iodide of potash internally, and this was ordered continued. He was kept under observation for a week or more during which time the hemorrhages increased, and the optic nerve became elevated. Increased tension had not yet developed and he was suffering no pain, but he was unable to perform his usual labor because of the disturbance in vision. All of the retinal veins of this eye took part in the process and the retinal arteries were extremely narrow, especially in the beginning of their courses. After the arteries passed over the disc they became wider. The vision in this eye was ability to count fingers at five feet.

Explanation was made to the patient of what was intended in order to avoid the loss of his left eye. Having gained his consent, several drops of adrenalin chloride solution, 1/1,000, were injected subconjunctivally on the day on which he was able only to count fingers at five feet. The following day the vision in this eye was 20/70; the next day 20/40; the succeeding day 20/25, and in a week's time his vision was 20/16.

During the two weeks after the first injection he received several more injections of adrenalin of the same strength and dosage, and though it was very difficult to note any improvement in the fundus picture from day to day, from week to week there was a decided change for the better. He received five injections in all, over a period of a month.

It is three months since he started treatment and he was last seen on July 9th. The retinal veins are normal now and the retinal hemorrhages have been absorbed. The retinal arteries are still narrow in their beginnings and the veins are of normal width. The nerve head is normal in color and outline, but there are some very small changes in the macular region which seem to be confined to the inner layers of the retina. These retinal changes do not disturb his acuity of vision which is now 20/13. The visual field in this eye, taken with Peter's campimeter, using a 5 mm. test object at a distance of 33 mm., shows the form field and the color fields for blue, red and green to be slightly narrow. He has perception of green out to 30° on the temporal side, 20° on the nasal side, 20° above and 10° below. The visual field for green in the upper temporal region extends 10° from the point of fixation. There is a slight enlargement of the blind spot below and temporally.

There is no doubt that had it not been for the treatment employed the patient would have lost this eye. Thrombosis of the central retinal vein, while uncommon, is not extremely rare, and many cases might be saved for useful vision by this method of treatment. No explanation is offered for the manner in which the adrenalin acted, and its use was only suggested by the remarkable observations reported in the first case. Believing that no ill effects could result the patient was advised to permit the treatment as outlined above. It is well known that adrenalin must be used very carefully in old age, in arteriosclerotic patients. Keeping this in mind and employing only small doses of two or three drops at a time there can be no objection to its use in cases similar to the two described.

912 American Bank Building.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

ROYAL SOCIETY OF MEDICINE, LONDON

Section of Ophthalmology

June 8, 1934

Mr. A. C. Hudson, president

Hypernephroma of iris

Mr. A. C. Hudson said that the rarity of metastatic tumor of the iris could be estimated by the fact that records of only 18 cases could be found. In 16 cases the primary growth was carcinoma; in one, pigmented nevus of the skin, and in another hypernephroma of iris. This last was the case of a man of 55 years, in whom three days previously the eye had been excised by Sir William Lister. There was noticed a peculiarity in the appearance, due to a white swelling with blood vessels which involved the upper third of the pupillary portion of the iris. One kidney had been removed two years previously, and was found to contain an encapsulated malignant tumor, which had ulcerated into the renal pelvis. On microscopical examination of the eye, all structures except the iris appeared normal. The thickening of the iris was found to be due mainly to infiltration with neoplastic cells, with widespread disorganization. Glycogen was demonstrated as present in fairly large quantity in the tumor cells. There could be little doubt as to the origin of the tumor from a hypernephroma of the kidney. Signs of iridocyclitis were present.

Sir William Lister said that this patient came to see him in August, 1912. Mr. Harry Fenwick had removed his kidney in Cairo two years previously, after which the patient was very ill with pneumonia. Accompanying a friend to see a colleague, the patient thought he would have his own eyes looked at, and then a growth on the right iris was discovered. This was the third opinion sought. He found a kidney-shaped new growth, close to the pupillary margin, above and slightly to the outer side. It was raised, nodular, whitish-yellow in color, and with vessels coursing over it. There was no injection of the eye, nor signs of tubercle of the iris. The fundus was normal, but there were a few vitreous opacities, and the vision was 6/6. It was decided that this was probably carcinoma, and accordingly the eye was removed without delay.

It was subsequently learned that the patient did not live longer than two years, and that death was due to tumor of the brain.

The significance of false projection in squint

Miss Muriel Pugh said that when one eye deviated there was a tendency towards diplopia. In many people, a history of transient diplopia or squint could be obtained. In some cases the diplopia persisted and the patient could not evade the difficulty, though this could be done by suppressing the image of one eye by a mental effort. Such eyes retained true projection. Diplopia could be overcome by a mental re-orientation of the displaced image, which was now localized in space in a position corresponding to that of the fixing eye, and this was known as "false localisation." Suppression of an image prevented the confusion which arose from diplopia. Alternating suppression might occur, the other eye being fixed while its partner suppressed. In this, neither eye deteriorated. A second means of dealing with diplopia was to develop false projection. In this method, suppression might be used, but it was not a total suppression.

In a series of 400 cases it was found that 169 (or 42 percent) had false projection, and 226 had true projection. A margin of error, however, must be allowed for, as strabismus cases were often treated by occlusion before the degree of binocular vision was measured, and so these might not be in their initial stage of projection. However the test was a subjective one. Children seen at

an early age gave unreliable answers. Therefore one could say that about 50 percent of squinting eyes developed false projection. True binocular vision was generally grouped into Worth's three grades: 1. simultaneous macular perception, 2. fusion with some amplitude, 3. depth perception. Binocular vision by false projection fell into much the same grouping. In a few cases the technic of binocular vision was developed to give a pseudo-grade 3 vision. Most cases with an ocular torticollis showed an effort to develop a vertical false projection.

With regard to the significance of false projection as related to operative results, if a patient's eyes were straightened by operation while he was still using false projection, he could, after operation, do one of three things: 1. He might develop a true projection and fuse with his eyes straight, or 2. He might pass through a transitional stage when he learned to readjust his projection so as eventually to adapt himself to the new position of the eyes. During this transition there was a false diplopia; before the new projection was developed there was a tendency to recover some of the original deviation. 3. He might show no sign of modifying his false projection, but retain it. Such a patient suffered from a troublesome false diplopia, and in his efforts to overcome this he reverted more or less, to his original deviation.

Discussion. Mr. Alabaster (Birmingham) said that "false projection" could not be considered apart from other symptoms of concomitant strabismus, namely, amblyopia, suppression, flight from fusion, the lack of visual improvement after operation. If one happened to throw images on to the macula in such a case fusion could result. If there was true projection in one part of the field he did not see how there could be false projection in another part at the same time. In treatment, the first necessity was to abolish the awareness of convergence; it was very important from the point of view of operation. If operation was done for squint and no such training had taken place, the muscular sense of the patient must be telling him that the eye was converging, and after the eye was put straight the same sensation would continue, and fusion would not result. But if one could get rid of that awareness of convergence and reduce the 40° of deviation down to 30°, and then operate, the eyes would be straight and the patient have the muscular feeling that they were straight. The vision was then likely to be better.

(Reported by H. Dickinson)

ST. LOUIS OPHTHALMIC SOCIETY

April 27, 1934

Dr. E. C. Spitze, president

Intravenous use of typhoid and paratyphoid vaccine in some eye diseases

Dr. J. A. Flury reported the results of his experience with the use of typhoid vaccine in eight cases of ocular inflammations. In each case satisfactory improvement was brought about and in such a way as to suggest the importance of the nonspecific foreign protein treatment.

Dr. Flury said that it had been shown by others that during the chill a leucopenia occurred. This was followed by a leucocytosis of 15,000 to 20,000 and even 35,000 had been seen. The general reaction was accompanied by a focal response, which was not the usual focal reaction of lighting-up of the lesion but a diminishing of the signs of inflammation. In the literature there was overwhelming clinical evidence of the value of this form of therapy.

Discussion. Dr. William F. Hardy further elaborated on one of the cases presented by Dr. Flury, the case being one of a retrobulbar neuritis in which the vision was reduced to 1/25. After a series of typhoid-paratyphoid injections there was an eventual return to normal vision. He also stated that the reaction appeared four to six hours after the injection.

Dr. R. E. Mason said that he had used typhoid vaccine in a well established case of sympathetic ophthalmia, but despite a rather severe reaction and tem-

porary improvement, the case went on to complete blindness.

Dr. Meyer Wiener stated that in a case under his observation two and one-half billion instead of fifty million typhoid bacilli had been given. Following this injection the patient became comatose with a temperature of 106 degrees. Large doses of strychnine and ice baths were given and the temperature was normal the following morning. He also cited a case in which another physician had given one and one-half billion typhoid bacilli without any harm to the patient. It was his observation that the most striking results were in those cases of infection following operation or injury where there was pus in the anterior chamber.

Dr. L. C. Drews cited two cases, one of suspected sympathetic ophthalmia and the other of hypopyon ulcer in which striking results were obtained and restoration of normal vision after the use of typhoid vaccine.

Dr. Lawrence Post stated that although typhoid vaccine was undoubtedly of great benefit in many cases, the immediate effect was not always good. He cited a case in which the patient had had a large central scotoma with vision reduced to counting fingers. A tonsillectomy was performed with improvement in vision to about 20/240 from counting fingers at a foot. Five days later typhoid vaccine was injected intravenously and was followed by a severe reaction. Accompanying the reaction the vision became reduced again to finger counting at 1 foot but complete recovery followed within a week.

Dr. J. A. Flury said that the fields in his case, taken with a 5 mm. white test object, were full. At the time the vision was low, there was a contraction in the peripheral field and a large central scotoma.

Local anesthesia for enucleation and removal of the tear sac

Dr. C. J. Gissy stated that the orbital infiltration anesthesia of Seidel for enucleation had given complete satisfaction. The operation for removal of the tear sac was begun about twenty minutes after the injection. He added that one of the patients that was operated on by Dr. Elschnig had complained of severe pain during the operation. He attributed this to the fact that the anesthetic was not permitted to act long enough before starting the operation. This same patient had had the opposite tear sac removed several years previously and had experienced no pain at that time. He called attention to the fact that the last 0.2 c.c. of anesthetic was injected immediately beneath the skin before the needle was withdrawn, so that the inferior palpebral ramus of the infraorbital nerve was anesthetized.

Discussion. Dr. H. R. Hildreth said that he blocked the infraorbital nerve in its canal, also, the needle was inserted deeply to catch the main nerve (nasociliary) before it divided into the infratrochlear and anterior ethmoid. By including the anterior ethmoid nerve, anesthesia was obtained in the parts underlying the lacrymal sac, the bone, periosteum and nasal mucosa.

Dr. Meyer Wiener stated that in anesthetizing the lids for operating on a chalazion, anesthetic was instilled in the conjunctival sac and then a wad of cotton soaked in the anesthetic was placed in the retrotarsal fold. The retrotarsal fold was then injected and after waiting about two minutes the lid could be operated on without pain.

Dr. John Green said that he noted that Dr. Elschnig started his operations less than five minutes after the intraorbital injection of novocain and thought that this was hardly time enough to insure anesthesia. He further added that he did not see why it was necessary to make four punctures for intraorbital anesthesia as a single deep injection of 2 to 4 c.c. of the anesthetizing solution would surely disseminate through all the loose tissues of the orbit.

Tendon transplants of superior and inferior recti in a case of Duane's syndrome

Dr. John Green said that R. D., Jr., male, aged 22 months, was first seen

September 30, 1931. The parents had observed from birth (which was an occipital presentation terminated by low forceps) an inability to move the left eye to the left beyond the median line. As the child grew older it was observed that he held his head slightly tilted to the right, the chin pointing to the left.

Examination revealed a typical Duane syndrome. On dextroversion the left eye moved freely, accompanied by a slight narrowing of the palpebral aperture. There was possibly a slight retraction of the globe. On attempted movement to the left the globe failed to pass the median line and the palpebral fissure widened. On account of the tender age of the patient, an accurate visual test was impossible, but the child readily recognized small objects at six meters with either eye. There were no eyeground changes. The refraction was a low hyperopia. Glasses were not ordered.

It was clear that we were dealing, not with a paralysis of the left externus, but with an inelastic fibrous band in place of this muscle. An advancement or tuck of this band would obviously be unavailing to increase abduction. It was determined, therefore, to transplant tendon slips from the superior and inferior recti under the tendon of the externus, and at the same time to set the internus several millimeters back.

Transplantation of tendon strips of the superior and inferior recti into the line of insertion of the externus was first proposed by Hummelshein (Trans. 34th Ophthalmological Congress, Heidelberg, 1907) and had been used successfully in many cases of incurable 6th nerve paralysis.

On referring to a paper that Dr. Green wrote in 1913 (Retraction movements of the eyes; acquired and congenital. Trans. American Academy of Ophthalmology and Oto-Laryngology, 1913, pp. 358-367) this operation was suggested for Duane's syndrome. An examination of the literature revealed the fact that there was no standard method of performing this operation, each operator having worked out an individual technic.

Operation was performed June 23, 1933, under ether anesthesia. The steps were as follows: 1. The left internus was exposed by an incision lengthwise of the tendon. 2. A double-armed silk suture was passed through the internus tendon at its insertion, one needle taking a bite near the upper margin of the tendon from without in, the other needle taking a similar bite through the lower margin. One needle was passed through Tenon's capsule and conjunctiva below, 4 mm. back of the tendon insertion. The tendon was completely severed and the suture tied, thus closing the wound. 3. An incision parallel to the temporal corneal limbus and 3 mm. from it, was made, beginning a little to the nasal side of "12 o'clock" and extending around to a little to the nasal side of "6 o'clock." 4. The superior, externus and inferior tendons were freely exposed. It was then noted that the externus tendon was represented by a thin fibrous band and gave no evidence (although the exploration was carried behind the equator) of muscle fibers. The appearance of this band was in marked contrast to the normal appearing superior and inferior recti tendons. 5. With a fine scalpel both superior and inferior recti tendons were split for a distance of 10 mm. the line of cleavage being a little to the nasal side of the mid-point of the tendon. 6. A double-armed suture (white twisted silk #3) was inserted in the strip (superior rectus) from below forward, thus forming a loop on the under surface. The strip was then shaved off from the insertion with a fine scalpel. 7. The same procedure was carried out on the inferior rectus tendon. 8. The nasally placed needle was passed under the externus band and made to emerge at the insertion. The temporally placed needle was passed under the tendon and was made to emerge just back of the insertion. Both needles were then passed through the conjunctiva from within out. By gentle traction the tendon strip was drawn under the externus tendon. 9. A similar procedure was carried out on the isolated strip of the inferior rectus. 10. Both white silk sutures were tied on the conjunctival sur-

face. 11. The conjunctival wound was closed with a continuous suture of black silk. A binocular bandage was applied for three days. The patient returned home on the fifth day.

At the end of a week the continuous suture was removed. The knots of the white silk suture were cut off and the balance of the suture, buried under the conjunctiva, was left undisturbed.

There had been a great gain in abduction. The boy could now move the left eye 18 to 20 degrees past the median line. Another gratifying feature was the improvement in the position of the head, there being now no tendency to head tilting. There was a slight defect of dextroversion and upward rotation.

J. F. Hardesty,
Editor.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

April 17, 1934

Dr. Hugo B. C. Riemer, presiding

The ocular complications of diabetes

Dr. J. Herbert Waite described the methods used in gathering medical and ophthalmological facts among 2002 consecutive diabetics from the Joslin group, and among 457 non-diabetic controls from the medical wards of the Massachusetts General Hospital. He discussed the statistical analysis of the medical and ophthalmological findings obtained from the 2459 patients, diabetic and non-diabetic, in the attempt to correlate the findings with regard to cause and effect. This analysis was aided by the use of punched cards sorted and cross-sorted by means of the Hollerith electric sorting machine.

In summarizing the chief findings of this series, it was pointed out that with increasing age and duration of diabetes, retinal hemorrhages and exudates tended to increase while the severity of the diabetes tended to decrease, as evidenced by lowered blood sugar levels, and by lower total insulin requirements with increasing years. There was evidence to cast doubt upon the validity of the belief that vascular hypertension or sclerosis alone could account for retinal hemorrhages of the type seen in diabetes. For example, 62 percent of these hemorrhages were found in patients with diastolic pressures under 90 mm. Hg. Retinal hemorrhages were found in 18 percent of the entire series. The youngest diabetic patient with retinal hemorrhages was 16 years old, and there were 15 patients under 40 years of age with hemorrhages. Two-thirds of the patients with retinal hemorrhages showed many hemorrhages, and one-third showed few. The incidence of hemorrhages in diabetes was 4 percent during the third decade of life, 15 percent during the fifth decade, and 30 percent during the seventh decade. The cause of retinal hemorrhages was thought not to be due to diabetes alone, and not to any of the more commonly assigned causes, but rather to the effect of an unrecognized toxin upon capillary permeability.

Fine wrinkles in the membrane of Descemet were found by slitlamp only, and not by loupe or ophthalmoscope, in 27 percent of the entire diabetic series, and in 10 percent of the non-diabetic series. The incidence of wrinkles in diabetes analyzed by age was one percent during the third decade of life, 20 percent during the fifth decade, and 50 percent during the seventh decade. These wrinkles were usually vertical, and were bilateral in 85 percent of the cases, and were not indicative of inflammation. No obvious correlation could be made out between wrinkles and ocular pressure, blood constituents, or insulin therapy.

A group of 31 patients, in whom diabetes was mild, but vascular changes pronounced, renal impairment the rule, and vascular hypertension constant, showed hemorrhage from larger retinal vessels, and tendency to retinitis proliferans with detachment of the retina by traction. While insulin had been condemned in this type of case by some workers, it was the opinion of the speaker that prognosis with respect to sight was very poor in this group, whatever the treatment might be.

Definite transitory refractive changes were found in 121 patients, or 6 percent

of the entire diabetic group. In 40 percent of these patients there was unquestionably subnormal accommodation for age. These changes were most common during the fifth decade, but of the greatest magnitude in young diabetic patients under treatment. Caution was given about premature change of glasses during transitory refractive changes.

A careful slitlamp study of each patient with dilated pupils revealed no form of cataract distinctive of diabetes, with the one possible exception of the so-called juvenile and bilateral type first described by Schnyder. Eleven juvenile cases were found with cataract of this type, and in six of these patients there was definitely a question of endocrine dysfunction. Complicated cataracts, as well as all other forms of cataract, were just as common in non-diabetic patients as in those with diabetes.

James J. Reagan,
Recorder.

CHICAGO OPHTHALMOLOGICAL SOCIETY

May 21, 1934

Dr. Dwight C. Orcutt, president

A century of progress in ophthalmic therapeutics

Dr. Oscar Dodd said that a hundred years ago ophthalmology had not developed into a specialty. Treatment of the eye was largely in the hands of the general practitioner, for the so-called oculist was in great disfavor with the medical profession, because he had no medical training. S. Wier Mitchell said: "I can remember when older physicians refused to recognize a man socially who devoted himself to the eye alone."

Much had been written of the exterior of the eye, but there was very imperfect knowledge of the anatomy and physiology, and practically nothing was known of the pathologic changes. As an example; although Sömmering had noted the macula or yellow spot in the retina, it was not known whether this was a hole or a thinning of the retina. The change in color of the iris when inflamed was thought to be caused by the lymph and not by congestion, as was now known. The iris was supposed not to have any blood vessels, for the simple reason that no blood could be squeezed from it after it was removed from the eye. Much of this was soon cleared up by the better methods of examination due to the great improvement made in the microscope.

The true nature of inflammation was not understood, and the term ophthalmia was used to indicate disease of the eyeball as well as of the conjunctiva. If a patient had severe inflammation of the conjunctiva, blood-letting was the principal treatment. Calomel and opium were given until salivation occurred. When secretion was present, nitrate of silver solution was applied, red precipitate of mercury ointment was used between the lids, and infusions of opium given.

When the iris and interior structures were involved, treatment was the same as for conjunctivitis, including applications of extract of belladonna to the upper eyelids and eyebrows two or three times a day.

The term glaucoma had long been applied to the condition in which the pupil was enlarged and in which there was a greenish reflex, from which the name was derived. It was believed due to a degeneration of the choroid and destruction of the hyaloid membrane, the principal absorbing and secreting organ of the eye. With this membrane gone, the eye did not shrink, hence the increased tension noted in the later stages. Limited and sluggish movement of the pupil and other amaurotic symptoms were noted. If the pupil was small, the condition was apt to be mistaken for cataract, but when the pupil became dilated the greenish reflex distinguished it from ordinary cataract. Increased tension was not always noted as a symptom; Mackenzie mentioned it in 1830, but Sichel of Paris in his book on glaucoma, published in 1842, did not give it as a symptom. Wharton Jones, in 1847, gave a very accurate description of glaucoma, both acute and chronic, under the name of "arthritic posterior internal ophthalmia." He

mentioned hypertension as one of the principal symptoms, and though he employed paracentesis of the eyeball to reduce it, the benefit was found to be transitory.

The treatment for glaucoma was the same as for the ophthalmias: bleeding, purging, and counter-irritants. Dilating the pupil with belladonna was recommended because it improved the vision, and might be applied day after day as a palliative. The general conclusion was that whatever treatment was used, blindness was sure to follow. It was not until von Graefe originated his operation of iridectomy, in 1856, that any permanent benefit was obtained in the treatment of glaucoma. He was not able to give any reasons for the success or failure of the operation, and it was not until Priestly Smith, in 1878, published his masterly article on the pathology of glaucoma that this was well understood.

As to miotics, while eserine was first extracted from the calabar bean in 1863, and many experiments had been made with it, it was not used in the treatment of glaucoma until 1882, when both eserine and pilocarpin were recommended, especially in the chronic cases.

Progress in ocular therapy had at all times been influenced by discoveries in the more general sciences, but the most notable advance in this special field had depended to a very great extent on the development of instruments of precision for the examination of the eye.

The invention of the ophthalmoscope by Helmholtz, in 1851, marked a great era in the development of ophthalmology as a respectable specialty. It was necessary to make many changes and improvements in this instrument before it could be used effectively by the practicing physician.

Although American ophthalmologists were among the first to adopt the ophthalmoscope, it had its strong opponents. Dr. B. Joy Jeffries of Boston, after he returned from his study with Helmholtz, undertook to give an account of the ophthalmoscope before a medical society. There was a very heated discussion, and an old doctor sitting next to Dr. Jeffries, having forgotten that Jeffries had read the paper, exclaimed to him, "I'd shoot any man who dared to use that infernal instrument on my eye."

Von Graefe, in the same year that he devised iridectomy for glaucoma, called attention to the changes in the field of vision as a diagnostic symptom in diseases of the eye. Foerster made the first perimeter for the outlining of the field, in 1868.

The problem of asthenopia had long been considered, and as far back as 1843 Mackenzie had given his views as to the cause. He wrote that asthenopia was due largely to a disease of the accommodative apparatus, associated with weakness of the retina, as vision was not good in the tired eyes. The treatment advised was rest of eyes, bloodletting, depletives, alteratives, tonics, and convex glasses. It was not until the ophthalmoscope came into use, however, that the need of glasses was found to be the principal cause of asthenopia.

Helmholtz, in 1857, devised an ophthalmometer to measure corneal astigmatism, but it was difficult to manipulate. This was afterward improved by Javal and Schiötz, and by 1881, had become a workable instrument.

Herman Knapp, while docent under Helmholtz in Heidelberg, was the first to publish, in 1860, the conclusion that regular astigmatism was one of the principal causes of asthenopia.

Following the scientific studies of Helmholtz, it remained for Donders to give to the profession a practical clinical interpretation of refraction and accommodation, in his classical work, published in 1866. He was the first to prescribe cylindrical lenses and to call attention to the relation between refractive errors and strabismus.

Soon after Donder's book appeared, Dr. John Green of St. Louis, one of Donder's students, wrote an article on the Detection and Measurement of Astigmatism, published in the United States in 1867. It was not long before cylindrical lenses were prescribed and ground in the United States.

The diagnosis of refractive errors was dependent on the ophthalmoscope for many years. It was not until about 1886

that retinoscopy came into general use, and much was written about it by Jackson, Thorington, and others. At this same time homatropin began to be substituted for atropin as a mydriatic in refraction.

Among the great discoveries in general medicine was the germ etiology of disease, in 1878. This also applied to ophthalmology, as it explained the cause and transmission of many eye diseases.

Boric acid, known since the eighteenth century, now came to be used as a mild antiseptic wash. Credé brought forward the wonderful prophylactic value of mild solution of silver dropped into the eyes of the new-born.

Electricity in ophthalmology began to be employed about the middle of the century. Electrolytic epilation was first used in 1869 by Michel of St. Louis.

A number of new drugs came into use toward the end of the century, among them protargol, adrenalin, dionine, euphthalmine and holocaine. The first sub-conjunctival injections of corrosive sublimate were given in 1866. These injections were used by Rothmund for the removal of corneal opacities. The value of cocaine as an anesthetic for the eye was an important discovery in 1884. Its employment became general in operations of the eye, if there were no congestion or hypertension. The supply was at first so small, and the demand so great, that its price rose to a guinea a grain.

The Roentgen ray was first used for the localization of a foreign body in the eye by F. H. Williams of Boston, in 1895.

In recent times we again saw ocular therapy influenced by new instruments of precision, the most important of which was the slitlamp. This instrument made possible the observation of such minute details of cornea, aqueous, and iris, that pathologic changes might be detected in their earliest stages, and the progressive effects of treatment be directly observed.

Ultraviolet phototherapy was now employed successfully in the treatment of tuberculous lesions and phlyctenular inflammations of the eye. Local phototherapy was recommended for certain diseases of the lids and conjunctiva. Foreign protein therapy had its advocates, typhoid-paratyphoid vaccine, and anti-diphtheritic serum being among the agents used.

A century of progress in ophthalmic teaching

Dr. W. E. Gamble said that in the earlier days it was impossible to obtain ophthalmological training in this country. The beginning of separate eye teaching in Chicago came about by the founding of the Chicago Charitable Eye and Ear Infirmary in 1858 by Dr. E. L. Holmes. In 1867 he was made full professor of ophthalmology at Rush Medical College. A similar advancement was made by Dr. John S. Hildreth who in 1866 by mergers established the Cook County Hospital with an eye department. Dr. Hildreth became the professor of ophthalmology at the Chicago Medical College. Dr. Ferdinand Hotz was another prominent early ophthalmologist.

Of the later men, the outgoing group, Dr. Gamble mentioned the names of William Wilder, Henry Gradle, Casey R. Wood, and Charles Beard. In the late 80's and early 90's two institutions with eye departments were established, the Chicago Polyclinic and the Post Graduate Medical School. The Chicago Eye and Ear College was organized a little later.

The outstanding organized effort to keep ophthalmologists growing had been the Chicago Ophthalmological Society. It had held approximately 360 sessions and now had an active membership of 181.

A century of progress in ophthalmic surgery

Dr. H. W. Woodruff said that in its evolution, ophthalmology had advanced at times very slowly and at other times almost by bounds. With the announcement of Brisseau of the true nature of cataract in 1706 to 1709 (which he discovered by opening an eye post mortem in which a cataract had been present) ophthalmology took a great leap. Cheselden's operation for artificial pupil in

1728 and the discovery of ether anesthesia in 1846 were further steps ahead. With von Helmholtz's invention of the ophthalmoscope in 1851 a strong impetus to the field of ophthalmology was created. Von Graefe's iridectomy for glaucoma in 1857, Pasteur's and Koch's work in bacteriology combined with Lister's teachings of antisepsis and the protection of operative wounds from the invasion of germs in 1867, and finally Koller's announcement of ocular anesthesia by cocaine in 1884 were introductory to the modern surgery of the eye.

One of the most interesting of the outstanding achievements in our specialty was the removal of magnetic fragments from the interior of the eye. About 1900, Dr. Woodruff had heard Haab read his paper on the giant magnet. He advocated the drawing of the steel through the suspensory ligament into the anterior chamber. Since then the Sweet method of x-ray localization had made this procedure advisable in certain cases only. The whole development of foreign-body surgery of the eye was less than a half century old.

Remarks on cataract surgery

Dr. W. A. Fisher read a paper on this subject. He mentioned the reports given at the February, 1933, meeting of the College of Physicians, Philadelphia. These papers were by Parker, Knapp, Ellett and Peter and concerned their results after intracapsular cataract extraction compared to the extracapsular method. The proceedings of this Philadelphia meeting were published in the May, 1934, issue of this Journal.

Robert von der Heydt

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

May 26, 1934

Dr. F. H. Brandt, president

The use of barbituric acid compounds with local anesthetics

Dr. Clinton H. Thienes, Professor of Pharmacology, University of Southern California Medical School (by invitation) presented the problem of untoward reactions from cocaine and its various substitutes used as local anesthetics. He stated that animals injected with cocaine died of circulatory respiratory failure, but when barbituric acid derivatives were used in preliminary preparation of these animals, large amounts of the former substances could be given without causing death. Pentobarbital had been found to be the most efficient of the barbiturates. Dr. Thienes stated that it was his opinion that all patients about to receive a local anesthetic should first be given a barbituric acid derivative.

Discussion. Dr. Brandt asked if a one half percent solution of cocaine might cause a reaction.

Dr. Boyce commented on some of the recent reported effects from barbital sedatives in the condition of agranulocytosis.

Dr. Weymann interjected that apparently such cases were due to compounds containing amidopyrine.

Dr. Thienes's answer was the general statement that all depended upon whether an idosyncrasy existed. Barbituric acid would not cause a circulatory collapse and synephrine used intravenously was the drug of choice in these cases. Barbituric acid preparations were only of value when used before the local anesthetic was given.

Rodent ulcer of the cornea

Dr. M. N. Beigelman reviewed the literature on rodent ulcer and presented three cases. He stated that the condition was first described in 1867, that it always started at the periphery, was always accompanied by a marked hyperplasia of episcleral tissue, and if not checked might destroy the vision of both eyes.

In three cases treated by Dr. Beigelman repeated paracentesis and constant hypotony for a period of time gave the best results.

Harold F. Whalman,
Recorder.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

October 9, 1934

Dr. Louis Levy, presiding

Detachment of the retina, two cases

Dr. E. C. Ellett reported the case of Mrs. P., aged 58 years, who was seen in November, 1933, with a visual disturbance in the right eye of five weeks' duration and without apparent cause. In this eye the retina was detached over the upper half of the fundus reaching almost to the disc. No retinal tear was seen. A few days' rest in bed resulted in a subsidence of the detachment, which receded about 2 disc diameters from the disc, and appeared in two unequal lobes. A tear was now seen in the lower lobe, at "10 o'clock", 3 disc diameters from the ora serrata. The retina was best seen there with +8, the central lobe being best seen with +12. On November 6th, the patient was operated on under local anesthesia. The superior rectus muscle was divided and the whole upper half of the globe exposed. A circular area was treated with the contact method of diathermy (Larsen method) the applications being made with a current of 65 milliamperes. The central area of the sclera was trephined and the superior rectus muscle and conjunctiva replaced. Two days later a good red reflex was present over all the fundus. She left the city in two weeks. In September, 1934, she had vision of 6/7.5 with glasses. The retina was in place everywhere, there were a few floaters and the coagulated areas showed like disseminated choroiditis. The visual field before operation consisted of an island in the temporal field extending from the 15 degree circle to the 80 degree circle and about 30 degrees above and below the horizontal. After operation the field was fully restored with only slight contraction.

The second patient, Mrs. S., aged about 55 years, had been under observation for many years and had always had good eyes. On June 9, 1934, she had vision O.D. 6/6 with —.50 cylinder axis 125°. The left eye was normal. On July 11th, there was a sudden failure of vision in the right eye without apparent cause, except that she had for some time been using some vigorous eye exercises as described in a book on psychology. The vision in the eye was moving objects, due to a detachment up and out from "12 to 9 o'clock" with a tear at "11 o'clock," 3 or 4 disc diameters from the ora serrata. The detachment came within 2 disc diameters of the disc. She was seen two days after the detachment occurred, and after 3 days in bed without effect on the detachment, she was operated on under local anesthesia. The detached area was surrounded by contact applications of diathermy, and then a ring of micro-pins was placed around the region of the tear. The sclera was then punctured and the conjunctiva replaced. The muscles were drawn aside, not divided. On October 1st, vision in O.D. with +.50 cylinder, axis 15° was 6/6 partly. The field, before operation was wholly lost in the lower inner quadrant and included the center. After operation the field was fully restored. The coagulated spots could be plainly seen and the retina was in place.

Glioma of the retina

Dr. E. C. Ellett also reported J. A., a boy of 14 months who was seen in July, 1932. Six months before, when he was 8 months of age, the parents noticed a difficulty in vision and yellowish reflexes from both eyes. The eyes were sometimes red. The family history was of interest. The paternal grandmother died of cancer of the uterus, a paternal aunt of cancer of the antrum, the paternal grandfather of a malignant tumor of the neck, and a brother had a cranial injury at birth.

The right eye showed a normal iris and active pupil, the left a fixed pupil with atrophy of the iris. Tension was moderately elevated in each eye, and a white reflex was seen through both pupils due to a vascular mass filling about two-thirds of the vitreous chamber. Glioma was diagnosed and enucleation advised. Nothing was done, the parents deciding that death was probably a better result.

The left eye began to swell a few months after the visit, and finally burst. The swelling subsided and the eye shrunk. Six months later, that was about a year ago, the right eye began to swell and had continued to enlarge, otherwise the child seemed well.

A large mass protruded between the lids of the right side. The lids were red and stretched. The orbit was full of the growth, which distended the ball. The cornea had ruptured. There was slight enlargement of the cervical glands but none of the pre-auricular glands. The nose was freely open.

The left eyeball was white and shrunken, the anterior chamber was deep, cornea clear except for a superficial calcareous band across the center. The pupil was wide, the lens opaque. Radium was suggested for the right eye. There was no evidence of metastasis.

R. O. Rychener,
Secretary.

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THE VISUAL HALLUCINATIONS OF DELIRIUM TREMENS

In common parlance and in general literature the distinction between delusions, illusions, and hallucinations is not very finely drawn, and the two latter terms are especially apt to be used synonymously.

In psychiatric nomenclature, however, a delusion is a false belief, an illusion is a false perception, and a hallucination is a sensory impression without external foundation, and fabricated solely within the mind.

The general theory in explanation of halucinations is that they are due to automatic functioning of sensory centers. Such functioning must of course be associated with profound mental disorganization.

In some cases of mental disease, the patient relates the phenomenon directly to the sensory organ concerned. Thus, if asked where voices are heard he may answer, "In my ear." But another patient may place the voices in his head, and may deny that they are natural voices.

The terrifying hallucinations of delirium tremens have usually been attributed entirely to pathologic cerebration. Weekers, however, has recently (Bulletin de l'Académie Royale de Médecine de Belgique, 1934, volume 14, page 370) sought to explain them as due to somatic experience in the form of a positive central scotoma.

A positive scotoma occurring in this disorder of alcoholism was described two years ago by Morel (L'Encéphale, 1932, page 378). The scotoma was elicited by having the patient lie on his back looking up at a uniformly grayish-white ceiling (for from three to ten seconds). The scotoma was seen at the temporal side of the fixation point, but never extended beyond the normal blind spot. The position of the scotoma in the two eyes was as frequently heteronymous as homonymous. Its size, with the ceiling about ten feet away, varied from a few to thirty or even fifty centimeters

in diameter. The shape was usually oval, with the long axis horizontal.

Weekers described independently a similar scotoma encountered in tobacco-alcohol amblyopia. His technique differs from that of Morel. He places the patient in the dark room, facing a large sheet of white paper at a distance of about forty centimeters. The paper is strongly and uniformly illuminated by a light source placed to one side of and a little behind the patient. The latter covers the eye which is not under examination, and is instructed to look at the middle of the sheet of paper. The physician then holds his hand for several seconds over the eye which is to be tested, without pressing upon the eyeball, and requests the patient to keep this eye open. When the test is negative, upon uncovering the one eye the patient declares that the sheet of paper remains uniformly illuminated. When the test is positive, there is at first a vacant period of variable duration, sometimes two seconds or more, after which the patient declares that he sees very distinctly a shaded area at the point of fixation in the middle of the paper. This spot persists for a while without modification, and then rapidly fades and disappears. It is important to maintain steady fixation, since the shadow disappears if the eye is moved.

In the cases of tobacco-alcohol amblyopia examined by Weekers, this positive scotoma corresponded to the usual negative scotoma of this disease, and both underwent a parallel retrogression as the patient recovered. Weekers regards the positive scotoma of tobacco-alcohol amblyopia as identical in character with the positive scotoma which Morel demonstrated in cases of delirium tremens, and he agrees with Morel in interpreting it as the necessary basis for the visual hallucinations of the latter disorder.

The dimensions of the hallucinations vary in accordance with the size of the scotoma and the apparent distance to which it is projected by the optical system of the patient. He may see the scotoma as the head of a pin at his fingertips, as a bedbug in his bed, as a mouse or rat at six feet, or as a rabbit at twelve feet.

Since the size of the "animals" seen in these visual hallucinations depends simply upon their position in the projection cone, the appearance of rapid approach of the "animals" toward the patient, according to Weekers, is never accompanied by apparent enlargement, but on the contrary the "animal" seems to diminish in size.

The jerky movements, plurality, and indefinite repetition of the "animal" forms, less frequently experienced, are explained as due to tremors or sudden contractions of the extrinsic and intrinsic muscles of the eye. Thus a single central scotoma may give origin to multiple or serial hallucinations.

The Belgian psychiatrist D'Hollander, in discussing Weekers' essay, was disposed to attribute the scotoma observed by Morel to the influence of suggestion. Furthermore, he disputed the identity of Morel's scotoma with the scotoma demonstrated by Weekers in tobacco-alcohol amblyopia. According to D'Hollander, the hallucinations of delirium tremens are merely an expression of the mental condition—excitement, confusion, disorientation, followed by delirious ideas; the whole forming a very complex pathologic entity in which it is difficult to disentangle the bases of the various phenomena.

W. H. Crisp.

ATLAS FUNDUS OCULI

The invention of the ophthalmoscope opened a new field of observation, which caught the attention and excited the interest of physicians and surgeons, who were giving thought and study to the diseases of the eye. More than anything else, the ophthalmoscope furnished the foundation upon which the new department of medical science—ophthalmology—has been built. The new knowledge needed new words, and new mental pictures to represent it.

Among those who began first to use the Helmholtz ophthalmoscope were some, who at once employed pictures and diagrams to record and portray what they saw. Preeminent among

these were Edouard Jaeger, of Vienna, and Richard Liebreich. They published, in the best forms then available, the pictures they had made of their striking and important cases. It is said that on one of the pictures for his "Pathologie des Auges," Jaeger spent 200 hours of patient labor. Liebreich became so interested in his pictures, and their reproduction for his atlas, that he went to live in the Latin Quarter of Paris, to study the methods of painting and reproducing colored pictures. Jaeger published his "Hand Atlas," giving a wide circulation to his observations, and the pictures of Liebreich were reproduced in leading textbooks on diseases of the eye. Haab published his small atlas for wider circulation, and most later books on diseases of the eye contain some colored pictures of the ocular fundus. The books on medical ophthalmoscopy followed the same plan, beginning with Albutt, followed by Gowers. By such pictures the ocular lesions of general disease have become most widely known to the medical profession.

The latest work on ophthalmoscopy is the Atlas published by William Holland Wilmer, on his retirement from the Wilmer Institute of Johns Hopkins University. The printing of such pictures from plates reproduced by photography has greatly widened the field for colored illustrations. Any one who has followed the development of the National Geographic Magazine can realize this. In the Wilmer Atlas, a single artist, Mrs. Burgess, worked under the supervision of Dr. Wilmer, and his younger colleagues to produce the one hundred pictures of conditions that had been chosen from the cases coming to the Institute, and the practice of other ophthalmologists.

The technic of a certain artist gives a certain expression to all the pictures produced, but this is an advantage when we come to compare different pictures, to study the characteristics of any one pathological condition, or to make a differential diagnosis between conditions of different origin, but having some features in common. Then this latest atlas of fundus conditions has the advantage of the application of all the later laboratory methods of diagnosis. Jaeger worked days to paint exactly what he saw in a certain eye, but could not name or identify the exact pathologic condition that caused it. In Wilmer's Atlas we have a primary optic atrophy with a "Wassermann 4 +; spinal fluid Wassermann positive, paretic colloid-of-gold curve." A generation ago, recent miliary tubercles of the choroid were the only recognized tuberculous lesions of the fundus. Wilmer gives ten pictures of tuberculous chorioretinitis. Miliary tuberculosis of the choroid is mostly a terminal lesion of general miliary tuberculosis. The patient, whose case was illustrated in the volume dedicated to Sir William Osler on his 70th birthday, is still alive and well, twenty-two years after the chorioretinal lesion was recognized as tuberculous, and sixteen years after she spent four months in bed, with tuberculous pleurisy and important pulmonary involvement. Laboratory tests have revolutionized general medical diagnosis since Helmholtz gave us the ophthalmoscope, but medical ophthalmoscopy is still a rapidly extending field of scientific investigation.

An atlas fundus oculi is necessarily a costly book, but this one should be in every medical library. The large size of the pictures (life size as the conditions are seen with the ophthalmoscope) gives them a reality that will impress most strongly the student and the general practitioner of medicine and surgery, who studies them.

Edward Jackson.

CAPILLARITY AS A FACTOR IN DRAINAGE OF THE TEARS

In the first volume of his textbook, Duke-Elder has presented an attractive combination theory to explain the conduction of tears from the conjunctival sac. The theory of compression of the lacrimal sac by the forcible contraction of the orbicularis muscle was first proposed by v. Arlt in 1855 who held that upon closure of the eyelids, the lacrimal sac was compressed by the muscle and the tears contained therein forced

into the nose. Upon relaxation of the muscle the sac expanded and the tears in the conjunctival sac were drawn by negative pressure through the lacrimal puncta into the sac. Although this anatomical possibility was denied by Schirmer and Whitnall, still Ploman and his associates were able to prove volumetrically that the volume of the sac was decreased by closure of the lids. The theory of dilatation of the sac by the contraction of the fibres of the orbicularis and the internal palpebral ligament was proposed by Roser in 1851 who maintained that the sac was forcibly dilated by closure of the lids, thereby establishing negative pressure and thus drawing fluid through the lacrimal puncta from the conjunctival sac. This theory was later supported by much theoretical as well as experimental evidence.

Duke-Elder holds that both theories are correct in part, basing his belief upon the X-Ray, cinematographic studies of Ploman, Engel, and Knutsson. His description is "On closure of the lids, the upper part of the sac remained unchanged or became distended, while the lower part of the sac and the upper part of the duct became compressed, while on opening the lids these movements become reversed. It appears, therefore, that the passage of the tears from the canaliculus is assisted into the dilated upper part of the sac by aspiration, while the fluid which is already present in the lower part of the sac is expelled down the duct by compression of this part. On opening the lids, again, the collapse of the upper and the expansion of the lower part of the sac drives the fluid downwards, leaving an empty space for the next consignment from the eye."

This theory is probably correct as far as it goes, but other forces undoubtedly participate as is shown by an interesting case observed for the past year.

Marvin S., aged 11 years, developed a right-sided facial palsy subsequent to infantile paralysis at the age of four years. His present condition has remained unchanged for the past few years. The majority of the muscles on the right side of the face have but little action. The orbicularis functions slightly in the upper lid, but not at all in the lower lid. Upon attempting to close the eye, the upper lid sinks to about one half of the normal distance, partially due to action of the orbicularis and partially due to gravity. The lower lid is entirely inert. The eyeball rolls up for protection. The lower lid has not sagged away from the eyeball and the lacus lacrimalis is approximately normal in size and relationships. The lacrimal puncta are in normal position and dip properly into the lacus. The lacus lacrimalis is filled constantly with tears *which do not overflow upon the cheek* unless the eyeball is irritated by strong wind, etc. These tears form continually and slowly seep away through the lacrimal drainage apparatus. When removed by wiping, the lacus fills again in about three minutes. Closure of the eyelids, in so far as it is possible, has no effect upon the amount of fluid in the lacus.

Here is a case in which the muscular action upon the lacrimal sac is entirely lacking, still there is a slow flow of fluid through the drainage apparatus. In all probability, capillarity is the actuating force. Molinelli suggested that theory as far back as 1773 and the majority of writers agree that it is a minor, but not a major factor in tear drainage. One case proves nothing, but each additional bit of evidence tends toward building a structure of positive knowledge. The bibliography dealing with this subject is to be found in Duke-Elders' textbook.

Harry S. Gradle.

FIFTIETH ANNIVERSARY

Nineteen hundred and thirty-five concludes the fiftieth year that the American Journal of Ophthalmology has been published uninterruptedly as a monthly journal so it seems fitting that a brief review of the growth of this Journal during these years be presented and a tribute paid to the many men who as editors or contributors have helped bring it to its present development.

Little mention need be made of Series I which was published from July, 1862,

to January, 1864, as a quarterly, under the editorship of Julius Homberger, because Dr. Ralph I. Lloyd has described this early Journal with its eccentric editor so well in the American Journal of Ophthalmology for December, 1932. An early demise was foreshadowed by the fact that almost every article in the January, 1864, number was by the editor. One feature of this first volume, not mentioned by Dr. Lloyd, that catches the reader's eye immediately is the introduction of a very good colored plate of the fundus. The great space given to diphtheritic conjunctivitis, which is referred to as "one of the most important points of ophthalmological practise" illustrates medical progress, as this disease is now a clinical rarity.

The composition of Homberger's Journal exhibited certain features embodied in the Journal today. Departments of original articles, editorials, correspondence, abstracts, and book reviews are recognizable. Among the last is one of R. Liebreich's "Atlas of Ophthalmoscopy" with twelve excellent plates, which was published in 1863. It is of particular interest because of the appearance in 1934 of the beautiful Atlas Fundus Oculi by Wilmer, which was reviewed in the American Journal of Ophthalmology for November, 1934, and on which editorial comment is made in this issue (see p. 68).

Volume I, Series II, Number I, appeared on April 15, 1884. Dr. Adolf Alt was the first editor. Nineteen associate editors were listed, among them Ayres, Buller, Green, Gruening, Howe and Loring. Two articles in the first number were by Alt, both of them featuring his favorite subject, ophthalmic pathology. A paper on "Purulent conjunctivitis of the newly born" was by Dr. Henry Schwartz, now emeritus professor of obstetrics and gynecology at Washington University. Since Dr. Alt was a Saint Louisan, it was natural that the Journal was published in Saint Louis.

Series II showed marked improvement in quality of paper but the illustrations remained primitive. Larger and better type was used. The list of forty contributors to volume one contains such well known names as Allport, Alt, Burnett, Callan, Fox, John Green, and Theobald.

In December, 1885, the editor announced that the Journal would be under his sole and absolute control and in January, 1896, the page size was increased. Dr. J. Ellis Jennings was made assistant editor. Half-tone plates appeared for the first time and the entire makeup was distinctly improved. Dr. Jennings remained assistant editor until 1900 at which time Dr. William A. Shoemaker replaced him. In 1909 his brother, Dr. John Shoemaker, succeeded him and was followed by Dr. William F. Hardy in 1915, who acted until 1918. In this year six journals, The American Journal of Ophthalmology, Annals of Ophthalmology, The Ophthalmic Record, Anales de Oftalmologia, Ophthalmology, and the Ophthalmic Year Book and Literature were combined under the able editorship of Dr. Edward Jackson to continue as the American Journal of Ophthalmology. No one could have taken the task more to heart or have contributed more of himself to an undertaking than Dr. Jackson did to this.

The Editorial Board of this new amalgamation was composed of Edward Jackson, editor, Clarence Loeb, associate editor, and other editors, Alt, M. Uribe Troncoso, Wiener, Wood and Würdemann.

The Journal then approximated its present form and size. The two column page was adopted and the material vastly increased. Some changes in the editorial board occurred during the next ten years of Dr. Jackson's editorship. Dr. Alt, who had been so active as editor-in-chief for thirty-four years, died in 1920. In 1928 Dr. Crisp was appointed to succeed Dr. Jackson who had been trying to retire from the editorship for several years but had continued because of the urgent request of the Board of Directors. Dr. Crisp functioned for three and one half years, to be succeeded by the present editor when pressure of practice forced Dr. Crisp's withdrawal from the many demands made on editors-in-chief. Fortunately both Dr. Jackson and Dr. Crisp have continued to bear active

and important parts in the Journal.

A special tribute should be paid to Dr. Clarence Loeb who was the very active and efficient associate editor for thirteen years and retired only when ill health made this necessary.

At the time of the amalgamation of the journals the publication of the Year Book was taken over by the American Journal of Ophthalmology. This was continued for ten years but finally, in 1927, had to be abandoned because of the inability of the Journal to bear the financial burden as the Year Book was published at a large annual loss and it was impossible to induce the profession to support this effort. The Journal has endeavored to render Year Book service by publishing a very complete abstract department. This has been possible because of the untiring efforts of Dr. Crisp and the loyalty of twenty or more abstractors who have given their time and energy unstintingly and without remuneration to this work. To them the editor takes this occasion to express his most sincere appreciation and gratitude.

What the next fifty years will bring to medicine and ophthalmology we do not know. We hope that the projects so well started by earlier ophthalmologists will be carried forward and we trust that the American Journal of Ophthalmology may serve our profession in the years to come as it has in the past fifty years. Lawrence T. Post.

BOOK NOTICES

Section on Ophthalmology, A.M.A., Transactions for 1933. Cloth 355 pages. Illustrated. Chicago, American Medical Association.

In addition to the Address of the Chairman, F. H. Verhoeff, of Boston, upon "Ophthalmology as a Career," this volume contains the 26 scientific communications presented at the meeting. Most of these papers have also been published in the Journal of the A.M.A., or in special journals devoted to ophthalmology. But only in this volume are they all brought together with the discussions they elicited. There are also the minutes of the meeting, the reports of the Committees, the lists of members of the Section, and its former places of meeting and the officers.

This series of volumes has much value, either for the historic facts, or the scientific papers and discussions that it furnishes. The pages of this volume reflect well the active scientific thought of the day and the positive advances that are being made in ophthalmic diagnosis, pathology and treatment of diseases of the eye.

Edward Jackson.

Cataract, its etiology and treatment. By Clyde A. Clapp, M.D., Lea Febiger, Phila., 1934. Two hundred and fifty-four pages, 92 engravings.

This is a very carefully prepared treatise on this subject. Practically every phase is at least considered and some very extensively. There are twenty-five chapters, beginning with the development of the human lens and comparative anatomy, by Ida C. Mann. The evolution of the subject is logical throughout. Extensive bibliographies are appended to some of the chapters for reference to quotations in the text. Indices of authors and subjects conclude the book.

The paper and binding are excellent, as are printing and editing also. Illustrations are well up to average and depict the subject adequately.

The two stereoscopic pictures are placed closer together than for use in the stereoscope but at a distance much simpler for stereoscopy without the stereoscope, a trick which most ophthalmologists have learned, now that stereoscopic reproductions are not uncommon for the illustration of ophthalmological articles.

It is a distinct advantage to have a complete treatise on one subject in monograph form.

Dr. Clapp's book on cataract will prove a valuable addition to the ophthalmologist's library.

Lawrence T. Post.

OBITUARIES

Marmaduke Stephen Mayou

Marmaduke Stephen Mayou, of London, who died July 20th, was born in 1876. He was the son of George Mayou, M.D. of Monmouth. Here in the hill country on the border of Wales, he grew up and attended school at the historic cathedral town of Hereford, twenty miles to the north. Twenty miles to the southeast was the Vale of Berkley, birthplace and burial place of Edward Jenner where he preferred to be a country doctor instead of a London consultant, and where he gave the world vaccination.

Young Mayou was a bright student, at King's College and in the London Hospitals. He held the Warneford Scholarship for Medical students, and took the Jelf Medal in 1896. At twenty-one he took the double examinations and became a licentiate in both medicine and surgery. At the age of twenty-five he was made a Fellow of the Royal College of Surgeons of England. Starting as House Surgeon at King's College Hospital, he was made surgical registrar and assistant radiographer to the hospital and demonstrator of anatomy in the medical school.

He was appointed chief clinical assistant at the Royal London Ophthalmic Hospital and was ophthalmic surgeon to several general hospitals, but the greater part of his clinical work was done at the Central London Ophthalmic Hospital, in which he was the Senior Surgeon. In 1904 Mayou published his monograph on "Conjunctivitis; Its Pathology, Varieties and Treatments". This had been awarded the Jacksonian Prize of the Royal College of Surgeons. His work on conjunctivitis brought to him the post of consulting surgeon to St. Margaret's Hospital, founded for the treatment of ophthalmia neonatorum; and later he succeeded Treacher Collins as visiting ophthalmic surgeon to the White Oak Hospital at Swanley, for children up to ten years old suffering from contagious diseases of the eye.

Mayou early became associated with Treacher Collins in the study of ocular pathology and in 1911 their joint volume on "The Pathology and Bacteriology of the Eye" was published in America as a part of the "International System of Ophthalmic Practice," edited by Walter Pyle. In 1924 a second enlarged edition of the work was brought out by Blakiston & Co., of Philadelphia. It was chiefly through this work, that Mayou was known to ophthalmologists of America and outlying dominions of the British Empire.

His book on "Diseases of the Eye" was published in 1908, as one of the Oxford Medical Manuals. It was intended to meet the needs of medical students and general practitioners. In 1920 he wrote: "The medical student's curriculum being already overburdened, in presenting the third edition of this book only such new material has been added as to bring the volume up to date." It is the best book of its class, a shining example of the genius of British writers on ophthalmology for practical common sense.

It was as a teacher, organizer and friend that Mayou will be best remembered. In the London *Lancet*, his colleague Leslie Paton has referred to "his work which has proved of the greatest value to British Ophthalmology, but which is as a rule, only too little recognized, work done on councils, committees and subcommittees. Only those who were associated with him, in these too often thankless tasks, know how faithfully he did anything he undertook to do. He served on the editorial committee of the British Journal of Ophthalmology from its initiation in 1917. He was one of the earliest members of the Council of British Ophthalmologists and, in addition to being treasurer, served on many of its committees. He was at various times member of the council, secretary and vice-president of the Ophthalmological Society of the United Kingdom, and I am sincerely thankful that he lived to achieve the highest honor in British Ophthalmology, the post of President of that Society. It is only too difficult to find men willing to give their time and energy to committee work of that type which brings little credit or honour to the individual worker, but is in its way

as essential as the more showy scientific or clinical work, and it is only an ordinary truth to say that on all these committees the place that Mayou occupied will be difficult to fill. Whether on the golf course, the riverside, or in the quietude of social life, he was a charming companion. A slight occasional hesitancy of utterance served only to draw attention to the clearness of his thinking and the lucidity of his expression. In all ways he fulfilled the dictum of our first president, Sir William Bowman, and by his life's work advanced the science of ophthalmology."

His personality is thus portrayed in the notice of his death that appeared in the British Journal of Ophthalmology: "Away from his work Mayou had many hobbies. He was a keen horticulturist and fisherman and an expert golfer. His country house at Camberley was near the links, and his kind hospitality to those taking part in the ophthalmic inter-hospital golf matches, will be an ever-green memory to those who played in them. As Captain of the Central London Hospital team he frequently led his side to victory.

"No account of Mayou would be complete without an allusion to the valiant fight he put up against ill health during the last five years of his life. Though physically a sick man, his zeal and energy were such that he completely conquered his disabilities. In the intervals between attacks, his zest for work, sport and hospital organization was untiring, and no one meeting him would have realized his handicap. He was a most genial and generous host, full of humour mixed with a kindly cynicism; a man one respected and loved, but never feared. He had great understanding of human nature, but little patience with inefficiency."

Edward Jackson.

HOWARD FORDE HANSELL, A.M., M.D.

In the passing of Doctor Howard Forde Hansell the Philadelphia School of Ophthalmology loses one of its most distinguished but none the less conservative members, distinguished for his skill and scholarship, conservative after the manner of the truly great. The scholastic atmosphere of Philadelphia offers little encouragement to boasting and bombast. Here progress proceeds along quiet and subdued lines and true worth and ability eventually bring reward and recognition. Howard Forde Hansell fitted well into the scheme of his native city and attained preeminence through merit alone.

He was born in Philadelphia October 25th, 1855, his father being Barnett Hansell and his mother, Rebecca Wetherill Hansell. He attended the public schools and the Philadelphia Central High School, the latter then being one of the outstanding schools of the city. He received private tutoring in addition for his entrance into Brown University from which he received the degree of A.B. in 1877 and A.M. in 1880.

As an undergraduate at Brown University he affiliated with many young men who were destined to occupy places of prominence in all walks of life. Among his class mates may be mentioned Charles T. Aldrich, Cotton Manufacturer and Brown benefactor; Clark Howard Johnson, late Chief Justice of the Rhode Island Supreme Court; Wm. Paine Sheffield, former Congressman from Rhode Island; Reverend Willis Frye Thomas, D.D., noted missionary to Burma; Judge William Grant Van Horne of the International Court of First Instance, Cairo, Egypt, and Fred Homwe Williams, late Brown University Trustee and prominent Boston lawyer. He affiliated with the Psi Upsilon fraternity. His chum and roommate was the late Rathbone Gardner, one time leader of the Rhode Island Bar. As in later life, his college years were marked by amiability coupled with becoming dignity and reserve.

Doctor Hansell's medical career began with his matriculation at the Jefferson Medical College in Philadelphia from which he received the degree of M.D. in 1879. He began to practice shortly afterwards at Sixteenth and Locusts Streets, Philadelphia, and continued to practice in that city for the

remainder of his professional career. The late Doctor William Thompson was at that time in charge of the ophthalmological department of the College and Hospital and Doctor Hansell became one of his assistants. In turn he became lecturer, chief clinical assistant, professor of ophthalmology, and finally emeritus professor of ophthalmology (in 1927). The Polyclinic Hospital, now the Graduate School of Medicine of the University of Pennsylvania attracted him on its incorporation and he became adjunct professor of diseases of the eye in that institution. He also became ophthalmologist to the Philadelphia Hospital.

His major literary efforts comprise co-authorship with J. H. Bell—"Clinical Ophthalmology" 1892; Co-author with Wendell Reber—"Muscular Anomalies of the Eye" 1899; Co-author with William Sweet, "Text-Book on Diseases of the Eye" 1903.

His minor literary work in ophthalmology was quite voluminous and covered every phase of the subject. He was a member of the committee (made up of Howe, Hansell, and Schneidemann) appointed by the Section on Ophthalmology of the American Medical Association to report upon the collective investigation concerning the ocular muscles in 1920.

Doctor Hansell was a member of the Philadelphia County Medical Society, the Medical Society of the State of Pennsylvania, the American Medical Association, and the American Ophthalmological Society. He was elected a Fellow of the College of Physicians of Philadelphia in 1886. In politics he was a Republican, and in religion he was a Baptist. He was also a member of the Rittenhouse Club of Philadelphia. He had no particular hobby as so many men have but secured his full measure of recreation and satisfaction in this regard by foreign travel, and by visiting the various European clinics, which he did almost annually. He was in Russia when the World War broke out, and his account of the difficulties that beset his return to this country made a stirring narrative.

He was married to Emilie Read Vogdes of New York City in January 3, 1887 who with one son survives him.

Doctor Hansell passed away November 5th, 1934 in Philadelphia.

Samuel Horton Brown.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision.
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy and embryology

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5. CONJUNCTIVA

Muller, A. R. **The rôle of climate in the etiology of trachoma.** Rev. Internat. du Trachome, 1934, v. 11, July, p. 147.

Muller makes the following statements. (1) Infected countries are located either between north latitudes 10 and 60° or between south latitudes 10 and 35°. (2) Trachoma occurs with maximum frequency and intensity in regions having subtropical climates and little rainfall and in which the soil is of primary or tertiary geologic origin. The author is of the opinion that climate plays a definite rôle in the epidemiology of the disease, the amount of rainfall being the dominant factor.

Phillips Thygeson.

Ochi, S. **A microorganism in trachomatous tissue.** Klin. M. f. Augenh., 1934, v. 93, Aug., p. 179. (Ill.)

In histologic and microbiologic examinations of trachomatous conjunctival tissue from 424 cases of trachoma and 101 cases of trachomatous ulcer or infiltration of the cornea, Ochi confirmed the presence of the gram-positive microorganism described in his preliminary communication. (American Journal of Ophthalmology, 1931, volume 14, page 848.) His method of fixing and staining is presented in detail. The microorganisms were more easily found in the palpebral than in the fornical part of the conjunctiva. C. Zimmermann.

Pascheff, C. **Calcifying-petrifying conjunctivitis.** Boll. d'Ocul., 1933, v. 12, Sept., pp. 865-871.

A young woman of twenty years showed whitish deposits in the inflamed and eroded conjunctiva of the lower fornix of both eyes, together with general and other local symptoms. Excision was followed by a new deposit on the surface of the wound. The deposit was formed by crystals of phosphate and carbonate of calcium or by amorphous bodies, which appeared on the conjunctiva as a result of a biochemic endogenous process that facilitated condensation of excessive calcareous salts from the circulation in the presence of air. (Bibliography, four figures.)

M. Lombardo.

Riddell, W. J. B. **Celiac disease associated with night blindness and xerosis conjunctivae.** Trans. Ophth. Soc. United Kingdom, 1933, v. 53, p. 295.

The author describes a case of night blindness and xerosis conjunctivae occurring in a boy with celiac disease (persistent malabsorption of dietetic fat). The diet that had been found agreeable to him contained sufficient vitamin A, but he was unable to absorb

fats which contained vitamin A. He recovered within ten days with vitamin A obtained from vegetable sources.
Beulah Cushman.

Rifat, A. **Primary sarcoma of the conjunctiva.** Ann. d'Ocul., 1934, v. 171, Sept., pp. 765-778.

Two cases of this rare condition are reported. A sixty-year-old man developed a rapidly growing tumor in the upper cul-de-sac. The tumor spread giving rise to three separate growths in the conjunctiva. There were no metastases to neighboring lymph glands or distant points. A man aged thirty years also developed a rapidly growing tumor that invaded the orbit. After exenteration of the orbit the mass was found to be a melanosarcoma. Radiation therapy is advised following surgical removal in such cases. H. Rommell Hildreth.

Rubert, J. **Notes on the treatment of trachoma.** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 327.

Rubert emphasizes mixed infection, especially the frequent occurrence of tuberculosis and "scrofulosis" in trachomatous patients, above all in pannus. He had good results from additional tuberculin treatment when Pirquet's test was positive, and within the last year he found a good adjuvant in calcium. He gave calcium chloride in from five to ten percent solution, from a dessertspoonful to a tablespoonful three times a day. C. Zimmermann.

Rycroft, B. W. **Ocular pemphigus.** Brit. Jour. Ophth., 1934, v. 18, Oct., p. 571.

Reference is made to the acute and chronic forms, pathology and bacteriology, the relationship of ocular to skin pemphigus, and differential diagnosis. A female aged forty years showed total symblepharon, trichiasis, and corneal ulcer, with pemphigus vulgaris of the skin. A male aged sixty-five years showed obliterated fornices and bilateral corneal ulceration. A female aged seventy-five years, treated for trachoma, showed total symblepharon. A male aged seventy years had the disease nine years, with throat, mouth, and nasal involvement, but no skin or corneal involvement and no xerosis. A male aged fifty-five years, with two years duration, had blisters in the mouth, no skin lesion, no xerosis, but symblepharon and pannus. Radium treatment seems to yield some improvement. The author suggests the following treatment; local instillations of paroleine daily; median tarsorrhaphy; regular epilation; surface radium application. (Four illustrations, bibliography.) D. F. Harbridge.

Sédan, J. **Trachoma and spring catarrh.** Rev. Internat. du Trachome, 1934, v. 11, July, p. 158.

Sédan reports the case of an Armenian with unilateral trachoma who developed spring catarrh a number of years after onset of his trachoma. The spring catarrh appeared to have an antagonistic action on the trachoma, reducing markedly the number of follicles. While the author does not draw any general conclusions from the single case, he suggests that future cases be studied with the possibility of defining such an antagonism.
Phillips Thygeson.

Shimkin, N.I. **A case of primary erysipelas of conjunctiva bulbi.** Brit. Jour. Ophth., 1934, v. 18, Oct., p. 583.

The first symptoms were unbearable pains in the left eye and in the corresponding half of the head. A limited edema of the conjunctiva in the region of the palpebral aperture and punctate hemorrhages in the upper scleral conjunctiva quickly increased in size under observation. The symptoms due to erysipelas of the eye were observed by the author ten hours before appearance of chill and rise of temperature and twenty-four hours before appearance of erysipelas on the face. (Three illustrations.) D. F. Harbridge.

Thygeson, Phillips. **The etiology of inclusion blennorrhea.** Amer. Jour. Ophth., 1934, v. 17, Nov., pp. 1019-1034.

Verzella, M. **Chemicophysical characteristics of the ocular liquids.** Rassegna Ital. d'Ottal., 1934, v. 3, July-Aug., p. 582.

Using the electrometric method, Verzella studies the pH value of conjunctival secretion in numerous normal eyes and in those with affections of the adnexa, of the conjunctiva and cornea, and in dacryocystitis, before and after removal of the sac. The (H°) was found lower in pathologic cases than in normal vision, especially in those cases in which there were pneumococcic infections. The pH was increased in pathological states. The author thinks the modification of the pH of conjunctival secretions may be correlated with pathologic states of the eyes and, to a certain extent, with the activity of the bacterial flora of the conjunctival sac.

Eugene B. Blake.

Walls, G. L. **The significance of the reptilian "spectacle."** Amer. Jour. Ophth., 1934, v. 17, Nov., pp. 1045-1047.

Zentmayer, W. **Trachoma in wrestlers.** Arch. of Ophth., 1934, v. 12, Aug., pp. 234-235.

Trachoma was found in two young professional wrestlers and attention is again called to this mode of transmission. J. Hewitt Judd.

6. CORNEA AND SCLERA

Beigelman, M. N. **Acquired cysts of the sclera.** Arch. of Ophth., 1934, v. 12, Aug., pp. 188-200.

Three cases of this rare condition are reported in patients aged twenty-eight, fifty-two, and seventy-nine years. In the first case the shrunken globe with a large cyst was removed and sectioned in toto. In the other two the outer cyst wall was removed and examined histologically. All consisted of scleral lamellae lined by epithelial cells. The histologic findings of previously reported cases are reviewed and the importance of trauma in their formation and location is stressed. The epithelial lining may arise by direct invasion of a wound or by implantation of surface epithelium. Theories as to the source of the fluid are reviewed. Treatment consists of removal of the anterior cyst wall if vision is present, otherwise enucleation. (Photographs and photomicrographs.)

J. Hewitt Judd.

Filatov, V.-P. **The cornea of the cadaver as material for transplantation.** Ann. d'Ocul., 1934, v. 17, Sept., pp. 721-734. (See Amer. Jour. Ophth., 1934, v. 17, July, p. 655.)

Giannini, D. **Bacteriologic and clinical contribution to the study of corneal ulcers from bacillus pyocyaneus.** Ann. di Ottal., 1934, v. 62, Oct., p. 869.

In a typical case of annular abscess of the cornea the organism was found to be the bacillus pyocyaneus. The condition progressed to early cure under the use of foreign protein.

The author feels that more important than local therapy is stimulation of the defense mechanism. (Bibliography).

Park Lewis.

Hermann, Pierre. **Annular abscess of the cornea.** Arch. d'Opht., 1934, v. 51, Oct., p. 671.

A woman developed complete annular abscess of the cornea two months after an acute exacerbation of trachoma with pannus. A small ulcer over one portion of the ring abscess was regarded as its starting point. Complete recovery of the eye occurred, with visual acuity of one-tenth. M. F. Weymann.

Huber, E. **Contact glasses in the treatment of ulcus serpens.** Preliminary report. Arch. de Oft. de Buenos Aires, 1934, v. 9, July, p. 317.

A contact glass of 5.6 or 7 mm. radius filled with salve for continuous medication has given the writer strikingly beneficial results in the handling of three cases of ulcus serpens. The glass was well tolerated for hours at a time, and is recommended in all incipient cases. (Illustrated.) M. Davidson.

Jones, E. L. **Simultaneous bilateral rodent ulcer of cornea, cured by combined curetting, thermocautery, and massive cyanide.** Brit. Jour. Ophth., 1934, v. 18, Oct., p. 579.

The patient was a woman aged sixty years. One treatment with carbolic acid and argyrol was of no avail. Two days later under cocaine the ulcer and adjacent sclera were vigorously curetted,

until a trough almost the entire thickness of the cornea and about three millimeters wide and about one-fourth of the circumference was made. This trough area was seared by thermocautery, and a massive subconjunctival injection of cyanide of mercury (2 c.c. of 1 to 1,500 solution) immediately given. In a number of days the conjunctival swelling subsided and the ulcer began to heal. In a few weeks epithelialization was completed and the trough filled with new-formed corneal tissue. Two days after treating the right eye the left became involved, and this eye was dealt with in the same manner. During the treatment the corneas were anesthetic to cotton thread, but within two and a half months sensation returned. Vision of 20/40 was recovered.

D. F. Harbridge.

Kraupa, Ernst. **The development of marginal ectasia of the cornea.** Zeit. f. Augenh., 1934, v. 84, Sept., p. 141.

Marginal ectasia of the cornea is not exclusively a senile manifestation. Kraupa believes that he has now observed the earlier manifestation in a boy of sixteen years. The child had red eyes which had been treated elsewhere as for phlyctenular disease. The conjunctiva of the lids was normal, that of the ball hyperemic and slightly brownish. At several places on the limbus papules appeared and disappeared without breaking down. Two millimeters within the upper limbus, in the substantia propria, was a curvilinear opacity made up of minute dots, beginning somewhat beneath Bowman's membrane and becoming denser and broader as Descemet's membrane was approached. Tiny tongues proliferated from the limbal vascular network and frequently white necrotic areas appeared and healed in a day. Corneal sensitivity was absent in one eye and greatly decreased in the other.

Kraupa postulates a neurotropic injury with a baneful influence on the circulation of the limbal network and on corneal metabolism. Since he considers the pterygium-like encroachment of the conjunctiva on the cornea as a mechanism of spontaneous recovery, he advocates conjunctivoplasty in the hope of halting further development of the lesion. F. Herbert Haessler.

Mellanby, E. **Xerophthalmia, trigeminal degeneration, and vitamin A deficiency. Jour. Path. and Bact.,** 1934, v. 38, May, p. 391.

Experimental investigations were undertaken in an attempt to correlate these two lesions produced in young animals by diets deficient in vitamin A. Animals were fed on diets deficient in vitamin A and were killed at various periods after the development of xerophthalmia. When the eye is affected by xerophthalmia even in the early stages, the ophthalmic branch of the fifth nerve generally shows degenerative changes. The corneal and nervous lesions develop almost synchronously. The nerve cells of the gasserian ganglion, as well as their nerve fibers, show degenerative changes. The evidence given suggests that xerophthalmia is secondary to a loss of the neurotrophic control normally exerted on the cornea by the ophthalmic division of the trigeminal nerve. Edna M. Reynolds.

Siegrist, A. **In tuberculous iridocyclitis how can the cornea be involved?** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 289.

Siegrist answers this question as follows, from clinical and anatomical observation: (1) through penetration of Descemet's membrane by toxins arising from precipitates, especially if they contain tubercle bacilli; (2) by tuberculous proliferation from the tuberculous iris into the anterior chamber, and by tuberculous tissue extending from the iris to the posterior surface of the cornea; (3) by tuberculous proliferation from the ciliary body and iris penetrating through the ligamentum pectinatum to the canal of Schlemm; (4) by like invasion of the adjacent sclera; and (5) by diffusion of aqueous containing toxin into the posterior strata of the cornea.

C. Zimmermann.

Sobanski, J. **Thickness of the cornea in vivo and its determination.** Klinika Oczna, 1934, v. 12, pt. 2, p. 323.

In spite of the measurements of the cornea in vivo determined and reported by Blix, textbooks continue to quote the measurements determined on cadavers. The author measured with the slit-lamp the corneal thickness in twenty persons, from seven to seventy-one years of age, and then by means of Hartinger's formula calculated the real thickness of the cornea from its apparent thickness. Tabulated results show the average thickness of the cornea in the various meridians.

Ray K. Daily.

Vele, M. **Experimental research on the action of homologous embryonal trephones on the cicatricial process of septic wounds of the cornea.** Boll. d'Ocul., 1933, v. 12, Sept., pp. 1028-1040.

The writer injected for several days 1 c. c. of fluid extract of rabbit embryo in rabbits whose cornea she had infected with staphylococcus albus. The infected eyes were enucleated at intervals of hours or days and were imbedded in paraffin. For comparison the author also imbedded in paraffin the infected eyes of rabbits that had been injected with physiologic salt solution. The karyokinetic process in the basal and median epithelial cells was more active in the former eyes, and their fibroblasts were transformed into young connective tissue in a shorter time. Embryonal trephones improve resistance to the infectious process, and accelerate cicatrization. (Bibliography and six figures.)

M. Lombardo.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Accardi, V. **Effects of blocking of the anterior chamber angle upon tension, albumen content, and refraction of the aqueous.** Rassegna Ital. d'Ottal., 1934, v. 3, July-Aug., p. 481.

Injections of colloidal sulphate of mercury in rabbits produced increased intraocular tension, with increase of albuminoids and of the index of the refraction of the aqueous. Such effects were not observed in control cases where gelatine or sublimate was injected. The author concludes that the phenomena observed were due to the toxic action of the vehicles in which the sulphate was prepared, and he attributes them to blocking of the anterior uveal tract. He thus confirms the importance of the vascular condition as to tension, percentage of albuminoids, and the refractive index of the aqueous.

Eugene M. Blake.

Bhaduri, B. N. **Choroideremia.** Calcutta Med. Jour. 1934, v. 28, April, p. 428.

A survey of thirteen cases of choroideremia previously reported in the literature is given, and a case is reported in which the optic discs and the macular areas had a normal appearance while the remainder of the fundi showed complete absence of choroid.

Edna M. Reynolds.

Caramazza, F. **Fatty degeneration of the eyeball.** Rassegna Ital. d'Ottal., 1934, v. 3, July-Aug., p. 499.

Three cases were seen before enucleation and were studied histologically. A forty-two-year-old male with congenital microcornea had a perforating wound, and secondary glaucoma followed. The cornea did not show the classic picture of xanthomatosis but was yellowish anteriorly except in zones of white. Microscopically were seen numerous droplets of fat under the epithelium and the middle corneal layers. There was a low-grade uveitis and the blood cholesterin was 2.75 percent. In a man of twenty-two years an eye blind from trauma in infancy became painful after a second injury, with chronic uveitis. The man developed a yellowish exudate in the anterior chamber. Crystals were present on the posterior surface of the cornea, on the iris, and in the exudate. There were symptoms of sympathetic irritation in the second eye. Histologically there were found a plastic uveitis, ossification of the choroid, and leucocytes in the hypopyon and in the uvea. The exudate was fatty. A man of forty-two years had an eye blind since infancy from an unknown cause. Removed because of pain, there were signs of old uveitis and intense fatty infiltration of the sclera, especially in the

angle of the anterior chamber, but also in cornea, iris, ciliary body, vessel walls of the choroid, retina, and lens. (Eight illustrations, two in colors.)

Eugene M. Blake.

Comberg, W. **Can a blind eye cause photophobia?** Zeit. f. Augenh., 1934, v. 84, Sept., p. 113.

In unilateral blindness with a perfectly normal fellow eye, photophobia is not uncommonly observed. The photophobia is not produced by the direct action of light on sensory nerves in the conjunctiva, cornea, or iris, nor as a result of a sympathetic irritation arising in the blind eye, but painful movements of the iris of the blind eye induced by consensual stimulation from illumination of the sound eye are responsible. Often the use of mydriatics keeps the patient comfortable, and enucleation is always effective. When the eye is blind from absolute glaucoma, one should instil mydriatics before advising enucleation.

F. Herbert Haessler.

Doggart, J. H. **Ocular crystals.** Trans. Ophth. Soc. United Kingdom, 1933, v. 53, p. 302.

This is a review (with an extensive bibliography) of the findings of crystals, usually cholesterin, in the fundus, the vitreous, the lens, the anterior chamber, and the cornea. According to our present knowledge these crystals are derived from albuminous effusions and from tissue destruction or from a combination of the two factors.

Beulah Cushman.

Focosi, M. **Pigment deposits on the posterior lens capsule.** Boll. d'Ocul., 1933, v. 12, Sept., pp. 872-905.

Five patients whose age varied from forty-one to fifty-four years showed a ringform deposit of pigment on the posterior surface of the lens capsule of each eye and deposits of various shape on the posterior surface of the cornea, also pigment granules in the aqueous and rarely in the vitreous. Four of the patients were myopic, two affected by tuberculosis of the lung, some showed symptoms of choroiditis with dystrophy of choroidal and retinal pigment and almost constantly a total or partial atrophy of the pigmented border of the iris. The author thinks that this condition is not congenital but a result of a chronic inflammation of the anterior segment of the eye or its deep membranes. (Bibliography, ten figures.)

M. Lombardo.

Friedenwald, J. S. **Notes on the allergy theory of sympathetic ophthalmia.** Amer. Jour. Ophth., 1934, v. 17, Nov., pp. 1008-1018.

Higuchi, R. **A case of metastatic choroidal abscess in clear ophthalmoscopic picture with histologic examination.** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 348. (Ill.)

A man aged sixty-three years had a furuncle in the left temporal region which opened spontaneously with evacuation of pus. From that time on he complained of hemicrania, violent orbital pain, and visual disturbance of his left eye. The ophthalmoscope revealed a greyish-white round prominence of about four disc diameters at the region of the posterior pole. The opacity of the vitreous increased and the patient desired enucleation of the eyeball. The histological examination is given in detail. It showed that the intrachoroidal abscess had at its apex perforated the hyaloid membrane and invaded the retina secondarily. Apparently the abscess was metastatic, starting in the choriocapillaris. No culture was made from the temporal furuncle or the blood, and no bacteria were found in the specimen.

C. Zimmermann.

Muck, O. **Is there a neurogenous heterochromia?** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 341.

In unilateral disturbances of conduction in the vasomotor area of the sympathetic nerve, Muck found a reflex vasoconstriction showing as a white streak on the inferior turbinate. So he applied the adrenalin test in two cases of heterochromia and four cases of Horner's syndrome. In all six cases the white streak appeared on the turbinate of the side corresponding to the depigmented iris.

C. Zimmermann.

Post, L. T. **Sympathetic ophthalmia.** Southern Med. Jour., 1934, v. 27, May, p. 421.

Twenty-eight cases of sympathetic ophthalmia are reported, in which the time of involvement of the second eye varied from three weeks to nineteen years after injury or operation. In two cases there was no penetrating injury. Eight cases followed operative wounds. Restoration of the fellow eye to normal vision occurred in fifty-four percent. In the one case in which enucleation of both eyes was necessary, it was found that the picture in the fellow eye does not always correspond with that in the exciting eye. In this case either a severe chronic inflammation in the first eye had caused sympathetic disease in the fellow eye or a very small penetrating injury of the cornea (paracentesis) had been sufficient to excite the disease in the fellow eye. Edna M. Reynolds.

Rischard, Michel. **The physiology of the light and accommodation reflexes.** Ann. d'Ocul., 1934, v. 171, Sept., pp. 755-764.

At least some of the sensory fibers in the pupillary light reflex are in the iris. By destroying the iris in rabbits a partial optic atrophy can be shown. Also, there are ganglion cells in the tapetum. The accommodative function is voluntary; the sensory fibers are retinal in origin. Motor innervation to the iris and ciliary body is the same, but with separate sensory fibers the pupillary responses to light and accommodation may be distinctive and pathologically separated as in the Argyll Robertson pupil. H. Rommel Hildreth.

Rohrschneider, W., and Sponholz, G. **A case of old disseminated choroiditis with complete autopsy.** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 314. (Ill.)

A man of fifty-three years showed in each eye an old disseminated choroiditis when examined twenty-four hours previous to his death from brain tumor. Histologically the choroidal foci were cicatrized. Their tuberculous origin could not be definitely proved. Two lymphatic glands along the aorta presented epithelioid nodules and partly caseous areas of more recent date than the choroiditis. But the presence of active tuberculous lymphatic glands in the mesentery suggested the origin of the ocular metastasis.

C. Zimmermann.

Szily, A. **Transplantation of material of human sympathetic ophthalmia into the eyes of chickens and monkeys, with remarks on the nature of the pathogenic agent.** Klin. M. f. Augenh., 1934, v. 93, Aug., p. 145. (Ill.)

Uveal tissue of human sympathetic ophthalmia was ground with physiologic salt solution and injected into the vitreous of chickens and monkeys. Simultaneous cultures and examination of the uveal tissue for tubercle bacilli were negative. The injection produced follicular infiltrations of the conjunctiva and orbital tissue, and also along the vessels of both optic nerves and the intracerebral paths, without spreading diffusely to the brain itself. In monkeys, apart from sporadic accumulations of lymph cells in the uvea, true uveitis of the second eye could not be obtained. Upon continued transplantation from animal to animal a tendency to formation of epithelioid and giant cells was observed, but other characteristics of human sympathetic ophthalmia were lacking. After introduction of tubercle bacilli the extraocular and intraocular infiltrations served as sites of predilection for formation of typical tubercles, sometimes with caseation. The author assumes that sympathetic ophthalmia may not occur spontaneously at all in animals.

C. Zimmermann.

Torrini, U. L. **Anisocoria in inflammatory lesions of the ear.** Riv. Oto-Neuro-Oft., 1934, v. 11, May-June, pp. 152-254.

Among forty patients affected by chronic purulent otitis media, four showed total destruction of ear drum and unilateral miosis. Among sixty patients affected by acute purulent otitis media, seven showed unilateral mydriasis and five unilateral miosis on the same side as the affected ear. The phe-

nomenon is present during evolution of the otitis. The author states that anisocoria is a result of either irritation (mydriasis) or paralysis (miosis) of sympathetic filaments which through the ear are connected with the filaments supplying the iris. M. Lombardo.

Unger, K. **Congenital aniridia.** Klinika Oczna, 1934, v. 12, pt. 2, p. 298.

A blacksmith thirty-five years of age had bilateral congenital aniridia, atypical corneal pannus, and total cataract. Through the left circumlental space could be seen vitreous opacities and circumpapillary choroidal atrophy, due most likely to myopia. The author attributes the disturbance to intrauterine inflammation. Ray K. Daily.

8. GLAUCOMA AND OCULAR TENSION

Croci, L. **Clinical and histologic study of hemorrhagic glaucoma.** Boll. d'Ocul., 1933, v. 12, Sept., pp. 942-971.

From histologic examination of five eyes it appears that degeneration of blood vessels of retina, uveal tract, optic nerve, and conjunctiva whose walls are hypertrophic and affected by hyaline degeneration is the main determining cause of hemorrhagic glaucoma, together with hemorrhages in these structures which occlude more or less the normal channels of exit. General examination, however, shows that the remote cause is to be found in deep kidney changes and in the resulting hypertension, the latter being a factor contributing to hemorrhage. (Bibliography, twelve figures.) M. Lombardo.

Holth, S. **Historical remarks on treatment of primary glaucoma.** Trans. Ophth. Soc. United Kingdom, 1933, v. 53, p. 326; also Norsk Mag. for Laegevidenskapen, 1934, v. 95, Jan., p. 19.

The author reviews the operative treatment of primary glaucoma (with bibliography) and in conclusion states that since 1916 he has abandoned classical iridectomy as applied to acute glaucoma, replacing it with subconjunctival iridencleisis with meridional iridotomy through a shortened incision (3 to 4 mm. long) with an extremely sharp bent stop-keratome. He also uses this operation in buphthalmic eyes.

Beulah Cushman.

9. CRYSTALLINE LENS

Handmann. **Multiple minute epithelial globules in secondary cataract, of the shape of insect eggs (butterfly-egg after-cataract).** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 310. (Ill.)

In three cases, five or six years after discission, Handmann found such minute globules on the secondary cataract and on the iris, without optical disturbance. Perhaps they were derived from the lenticular epithelium. They showed no tendency to growth in the course of a few months observation.

C. Zimmermann.

Lowell, H. W. **Twin keratome.** Trans. Amer. Acad. Ophth. and Otolaryng., 1933, 38th annual meeting, p. 429.

This instrument was designed to make the incision for subconjunctival cataract extraction. The keratome makes a long enough incision, but does not cut in the middle, so a blunt-pointed cataract knife is used to cut this middle portion. (Illustration.)

George H. Stine.

Mauger, P. **Postoperative cataract mask.** Ann. d'Ocul., 1934, v. 171, Sept., pp. 781-784.

The mask is made from a stiff material cut to allow for the nose. Tucks are made alongside the nose and over the brow to conform with the contours of the face. Perforations allow for ventilation. The mask is secured by tying behind the ears.

H. Rommel Hildreth.

Nizetié, Z. **A new forceps for removal of membranes and lens capsule.** Klin. M. f. Augenh., 1934, v. 93, Aug., p. 200. (Ill.)

After opening the anterior chamber with the lance-shaped knife the closed forceps is introduced. Then it is opened and the pointed arm penetrates the capsule, the forceps closes automatically,

and by twisting around its longitudinal axis the capsule is rolled up.

C. Zimmermann.

Nugent, O. B. **Electrodiaphake.** Trans. Amer. Acad. Ophth. and Otolaryng., 1933, 38th annual meeting, p. 430.

This instrument was designed for removal of the crystalline lens by electrocoagulation. The active electrode is pushed down into the lens, which adheres to it and is then delivered. (Two illustrations.) George H. Stine.

Peter, L. C. **Intracapsular cataract extraction.** Trans. Amer. Acad. Ophth. and Otolaryng., 1933, 38th annual meeting, p. 99.

Of 112 consecutive cases of extraction in the capsule, with smooth capsule forceps, 75.7 percent were successfully delivered without rupture of the capsule. In 6.7 percent Peter was unable to grasp the capsule with forceps. In 17.6 percent the capsule ruptured. In forty-three consecutive cases during the same period, in which the suction method of fixation was used, 9.1 percent of the capsules ruptured, and 90.9 percent were successfully delivered. Most of the failures were in young patients who, for the most part, had complicated cataracts.

The visual acuity was the same by either intracapsular method. In 43 percent vision of 6/5 or better was obtained, in 34 percent 6/6, and in 21 percent 6/7.5 to 6/15 because of fundus pathology. In forty consecutive extracapsular extractions, vision of 6/6 or better was obtained in 63 percent and 6/7.5 to 6/15 in 37 percent. Vitreous loss occurred in nine percent of cases of smooth forceps delivery, but no permanent harm to the eye resulted. Similar results were had in the vacuum cases of that series, while in a later series vitreous loss was reduced to 4.2 percent. Secondary glaucoma did not occur in any of the intracapsular cases. (Discussion.) George H. Stine.

Piekarska-Miaczynska, M. **A study of the postoperative intraocular tension in eyes operated upon for cataract.** Klinika Oczna, 1934, v. 12, pt. 2, p. 286.

The author measured the tension after cataract operations from the eighth postoperative day until the patient left the hospital, and subsequently for various periods of time. She found that in senile cataract cases the tension fell markedly, rose slowly, and reached normal only after one year. In linear extraction of soft cataract the tension was practically normal immediately after the operation. Ray K. Daily.

Sagher, E. **Contribution to the question of anterior polar cataract with accumulations of crystals in senile cataract.** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 355. (Ill.)

Microchemical examination of crystal-like formations at the anterior pole of the extracted cataract of a man aged sixty-five years showed with certainty that these formations did not consist of cholesterin, fats, fatty acids, phosphate of calcium, or other calcium salts, but of regressive products of albumen. C. Zimmermann.

10. RETINA AND VITREOUS

Arnaud, A., and Guillot, P. **Utilization of the Bailliart test of retinal arterial tension in the diagnosis of increased intracranial pressure following recent head injuries.** Ann. d'Ocul., 1934, v. 171, Sept., pp. 735-741.

Many cases of head injury show undoubted evidence of increased intracranial pressure but there are doubtful cases that are confusing to the surgeon. The author reports two series of such cases. In the first series it was possible by determination of retinal arterial pressure to advise the surgeon as to operation; and the accuracy was proved at operation. In the second series the retinal arterial tension was normal, operation was not performed, and the patients all recovered.

H. Rommel Hildreth.

Crawford, J. W. **A hole in the macula.** Trans. Pacific Coast Oto-Ophth. Soc., 1933, 21st annual meeting, pp. 26-33. (See Amer. Jour. Ophth., 1934, v. 17, Apr., p. 375.)

D'Osvaldo, E. **Clinical researches on retinal tonoscopy.** Boll. d'Ocul., 1933, v. 12, Sept., pp. 972-1027.

The writer gives the history of forty-five patients affected by nephritis, general hypertension, intracranial tumor or suspected tumor, sequelae of cranial trauma, epilepsy, or disseminated sclerosis, on whom Bailliart's sign was tested as an exponent of increased intracranial tension. Isolated hypertension, he states, exists if the diastolic pressure of the central artery is above one-half the humeral pressure. In most cases the isolated hypertension is an exponent of increased intracranial pressure. Bailliart's sign has no special value in the diagnosis of different endocranial diseases or complications, but it has diagnostic importance in the field of cranial trauma and also in the diagnosis of intracranial tumor before the appearance of choked disc. (Bibliography.) M. Lombardo.

Dykman, A. B. **Angioid streaks of the retina.** Trans. Pacific Coast Oto-Ophth. Soc., 1933, 21st annual meeting, pp. 36-46. (See Amer. Jour. Ophth., 1934, v. 17, July, p. 663.)

Greenfield, J. G., and Levin, S. **Amaurotic family idiocy.** Trans. Ophth. Soc. United Kingdom, 1933, v. 53, p. 170.

The author reports a late infantile case in a non-Jewish baby two years and ten months old. He gives the technique of study of the nerve cells in the cerebral cortex, and along the tract, the posterior root, and the sympathetic ganglia. Pathologically the case was characterized by extensive lipoid degeneration of the nerve cells, intense gliosis in the thalamus, widespread accumulation of fat-granule cells, and absence of cerebeller atrophy, macroscopically and microscopically.

Beulah Cushman.

Löwenstein, A. **Recurring paralysis due to hemorrhages from cerebral bloodvessels affected with tuberculosis.** Med. Klin., 1934, v. 30, June 29, pp. 868-870.

While the ophthalmologist knows well the characteristic clinical findings in tuberculous disease of the retinal bloodvessels, which causes recurring hemorrhages into retina and vitreous, no corresponding neurologic condition has been described, although a similar affection of the cerebral vessels must be assumed to exist. The author reports two instances of recurring transient paralysis of various groups of muscles in patients with pulmonary tuberculosis and periphlebitis retinalis, assuming identical lesions of cerebral and retinal vessels. Bertha Klien Moncrieff.

Marchesani, O. **Concerning juvenile recurring hemorrhages into the vitreous.** Klin. Woch., 1934, v. 13, July 7, pp. 993-994.

Contrary to the prevailing opinion that the affection of the retinal veins in juvenile recurring hemorrhages into the vitreous is of tuberculous nature, the author associates this disease with endangiitis obliterans (Buerger's disease). Findings in the extremities of such patients, especially pathologic changes in the capillaries, seem to support the author's view.

Bertha Klien Moncrieff.

Pischel, Dohrmann. **Present status of retinal detachment.** Trans. Pacific Coast Oto-Ophth. Soc., 1933, 21st annual meeting, pp. 113-134.

Sobanski, J. **A new ophthalmodynamometer.** Klinika Oczna, 1934, v. 12, pt. 2, p. 330.

The author describes in detail a new ophthalmodynamometer for which he claims superior sensitivity and a greater range than that of the Bailliart and Baurmann instruments.

Ray K. Daily.

Walker, C. B. **New ophthalmic diathermy unit with accessories for retinal detachment operation.** Trans. Pacific Coast Oto-Ophth. Soc., 1933, 21st annual meeting, pp. 172-175.

Wilczek, M. **Retinal fissure with formation of a hole.** Klinika Oczna, 1934, v. 12, pt. 2, p. 258.

Three months after a hard fall, a man of sixty-one years developed retinal

detachment in the upper temporal region of the right eye. Careful examination showed a tear in the retina. Nasally to the tear the inner retinal layer was seen as a delicate rose-colored, vascular transparent membrane, while the outer retinal layer was grey and wrinkled. The author ascribes the grey color of the detached retina to irregular diffusion of light through the wrinkled outer retinal layer. (Illustration.)

Ray K. Daily.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Much, V., and Hüppi, A. **Acute optic neuritis with sudden transient amaurosis as primary symptom of acute anterior poliomyelitis.** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 333.

The unusual feature in this case of acute anterior poliomyelitis in a woman of thirty-seven years was the occurrence of severe optic neuritis with amaurosis of both eyes as primary symptom, with paralysis of the sphincter, anisocoria, difference between reactions to light and convergence, and paresis of accommodation, ending in recovery with V = 1. The differential diagnosis from acute myelitis, which may have a similar onset, lay in the absence of disturbance of sensibility. The treatment consisted in diathermy and inhalation of amyl nitrite.

C. Zimmermann.

Satanowsky, P. **Several cases of luetic papilledema cured without surgery.** Arch. de Oft. de Buenos Aires, 1934, v. 9, July, p. 307.

Since vision is conserved intact as much as two to three months, luetic causes should first receive the benefit of medical treatment, and even for two or three weeks in cases of doubtful etiology. The therapeutic test is often of diagnostic significance. Fifty percent of the papilledemas seen by the writer have been luetic. The favorable evolution of nine cases of luetic meningitis under treatment, three with external rectus paralysis, is reported in detail. Surgery is therefore advised only as a last resort. M. Davidson.

Spaeth, E. B. **Swelling of the nerve heads with arachnoiditis and unusual changes in the visual fields.** Arch. of Ophth., 1934, v. 12, Aug., pp. 167-179.

A man aged forty-one years gave a history of migraine-like headaches of nineteen years duration. Ophthalmoscopic examination revealed temporal papilledema of the right disc, with dark purple discoloration. The fields showed a defect of the inferior nasal quadrant in the right eye and general contraction in both. Two weeks later a similar temporal papilledema appeared in the left eye. There was almost complete loss of the nasal field in each eye with the central field still intact. Craniotomy revealed marked dilatation of the right anterior cerebral, middle cerebral, and internal carotid arteries, localized arachnoiditis, and dilated vaginal sheath. The adhesions were released and the middle meningeal artery ligated, and marked improvement in health followed. About six months later the papilledema finally subsided but there was gradual continued impairment of the fields. The author believes that the dark purple discoloration of each papilla was due to slow, steady extravasation of blood from the ophthalmic artery along the vaginal sheath of the nerve and between its fibers, while the field changes were due to impairment of nerve fiber bundles in the optic nerve anterior to and at the chiasm, and to disturbances of the vascular supply of the optic nerve pathway and of the retina. (Drawings and perimetric charts.)

J. Hewitt Judd.

12. VISUAL TRACTS AND CENTERS

Balado, M., Malbran, J., and Franke, E. **Double hemianopsic incongruence of cortical origin.** Arch. de Oft. de Buenos Aires, 1934, v. 9, July, p. 295.

A case of intracranial hypertension with upper-right-quadrant hemianopsia, the scotoma being more marked in the 1/2000 isopter in the left eye and in the 3/300 isopter in the right eye, revealed at autopsy multiple brain metastases from a suprarenal tumor. The only lesions found in the visual pathways were in the lower lip of the left

calcarine fissure; an anterior one involving mainly the contralateral zone beneath the Gennari stria, and a posterior one involving principally the homolateral zone with extensive neighborhood infiltration and edema. The conclusions are that hemianopsic incongruence does not necessarily mean a tract lesion; that the incongruence in this case is due to unequal involvement of the homolateral and contralateral zones of the area striata; that the peripheral fields are represented in the cephalic portion of the fissure and the fixation point, and the temporal crescent and color vision in its middle portion; that a lesion of the gray matter of the calcarine fissure is alone sufficient to produce hemianopsia; and that edema alone in the zone of the calcarine fissure does not produce field defects or hemianopsia. (Illustrated.)

M. Davidson.

Bishop, G. H., and Bartley, S. H. **A functional study of the nerve elements of the optic pathway by means of the recorded action currents.** Amer. Jour. Ophth., 1934, v. 17, Nov., pp. 995-1007.

Finlay, C. E. **Visual field defects in pregnancy.** Arch. of Ophth., 1934, v. 12, Aug., pp. 207-219.

This report is based on 108 apparently normal cases examined during the last three months of pregnancy. Examinations were made on the Ferree-Rand perimeter with an illumination of seven foot-candles for 5/330 and 1/330 white and 5/330 red and blue, in those presenting normal white fields. Contractions were based on Traquair's standards with a ten-degree margin. A majority, seventy-three cases, presented bitemporal contraction, with some tendency to limitation or intensification in a quadrant. These changes were more marked in the last months of pregnancy and after successive pregnancies. Age was not a factor but the colored and Latin races showed greater predisposition. (Tables.) J. Hewitt Judd.

MacKenzie, I., Meighan, S., and Pollock, E. N. **On the projection of the retinal quadrants on the lateral geniculate bodies and the relationship of the quadrants to the optic radiations.** Trans. Ophth. Soc. United Kingdom, 1933, v. 53, p. 142.

A case report is given with description of the homologous incongruous visual field defects which were found, less than eighteen hours before the patient took lysol and died. Syphilitic arterial changes were confined to the geniculate bodies, one on the lateral side and the other on the mesial side. The localization of some of the macular fibers confirms some previous results obtained by Brouwer.

Beulah Cushman.

Mattirolo, G. **Ocular and labyrinthine symptoms in retroolivary bulbar syndrome.** Riv. Oto-Neuro-Oft., 1934, v. 11, May-June, pp. 248-251.

In the case presented the ocular symptoms included the Horner syndrome, and horizontal nystagmus was a prominent symptom. The author demonstrates, anatomically and clinically, that the sympathetic nerve syndrome is always unilateral and homolateral to the central lesion. The nystagmus is also an important symptom in so far as it manifests itself prevalently or exclusively toward the central lesion.

M. Lombardo.

13. EYEBALL AND ORBIT

Gallenga, R. **Advancement with tarsal insertion of Müller's muscle in the pseudoptosis of enophthalmos.** Rassegna Ital. d'Ottal., 1934, v. 3, July-Aug., p. 626.

Gallenga makes a slightly curved incision in the palpebral conjunctiva for the whole length of the lid and 2 to 3 mm. from the free border. From the outer end of this a vertical incision is made along the lateral border of the tarsus. The conjunctiva is separated. A strip of tarsus is then excised, leaving the upper portion of from 1.5 to 2 mm. to which Müller's muscle is attached. The tarsal parts are united by three sutures passing through the skin and the conjunctival wound is closed. (Nine figures.) Eugene M. Blake.

Goldstein, Isidore. **Recession of the levator for lagophthalmos in exophthal-**

mic goiter. Trans. Amer. Acad. Ophth. and Otolaryng., 1933, 38th annual meeting, pp. 133-147. (See Amer. Jour. Ophth., 1934, v. 17, Aug., p. 782.)

Goldstein, I., and Wexler, D. **Tumor of the orbit in a case of osteochondrofibrosarcomatosis.** Arch. of Ophth., 1934, v. 12, Aug., pp. 201-206.

The authors report the case of a man aged twenty-seven years who presented sarcomatosis of all vertebrae, ribs, skull, sternum, pelvic bones, and left humerus and scapula, with metastases to the lungs, heart, intestine, and mesentery. Death ensued three months after the onset of illness. There was a marked proptosis of the left eye caused by a tumor mass arising from the great wing of the sphenoid and compressing the posterior orbital contents. Histologically it was a fibrosarcoma containing immature cartilage and bone. (Diagrams and photomicrographs.)

J. Hewitt Judd.

John, I. **Pulsation in a peripapillary ectasia.** Zeit. f. Augenh., 1934, v. 84, Sept., p. 137.

In a fourteen-year-old patient with one emmetropic eye and in all other respects normal, the myopic right eye had a tremendous funnel-shaped ectasia in the region of the optic disc. The rim of the ectasia was visible with a —8.00 sphere, the apex with —15 to —20. Circular contractions began at the rim of the cavity and traveled to the tip at a rate suggesting a sluggish pupillary reaction. A diagram shows the position of the walls of the cavity in extreme contraction and relaxation. It is postulated that the changes depend on variations in pressure in eyeball and orbit.

F. Herbert Haessler.

Pines, B. **A rare case of foreign body in the orbit.** Klinika Oczna, 1934, v. 12, pt. 2, p. 274.

A screw was found imbedded in the apex of the orbit of a young boy after bursting of a pistol which the boy had constructed. The skin wound was over the nose. The screw was removed through an incision along the floor of the orbit, retracting the orbital contents upward. The eyeball was thus saved. (Roentgenograms.) Ray K. Daily.

14. EYELIDS AND LACRIMAL APPARATUS

Abu-Saif, Nessim. **The x-ray treatment of blepharitis.** Brit. Jour. Ophth., 1934, v. 18, Oct., p. 589.

The author found that the essential for success was thorough epilation of the cilia by the action of the rays. Cases in which the treatment failed to cause complete epilation, though showing marked improvement, invariably recurred. Better results were obtained when the epilation dose was given fractionally than when given all at once. To make the x-rays safely applicable a special forceps is used with long handles and adjustable shields, by means of which all the globe is protected except opposite the palpebral fissure. This latter area is protected by a lead glass prothesis. The rays are applied through a circular lead diaphragm 5 cm. in diameter. D. F. Harbridge.

Hagedoorn, A. **Telangiectatic granuloma—botryomycosis.** Brit. Jour. Ophth., 1934, v. 18, Oct., p. 61.

Botryomycosis, chiefly met with in horses and apparently only occasionally occurring in man, is characterized by chronic inflammatory development of granulation tissue and fistulae, causing tumors or swellings of the affected organ under the influence either of a special variety of staphylococcus or of a special reactive condition of the human tissue. A personal case affecting the eyelid is described. A few cases involving other regions could be found in the literature. D. F. Harbridge.

Katz, D. **Some principles of plastic surgery of the eyelids, with special reference to the Hungarian school.** Arch. of Ophth., 1934, v. 12, Aug., pp. 220-227.

The early history of plastics is reviewed. In 1835 Dieffenbach, the real founder of plastic surgery, devised a sliding flap for repair of the eyelid. Burow added excision of a triangular area at the end of the incision. In the Hun-

garian school, Siklossy applied the principle of oblique sutures for correction of ectropion. Blaskovics combined this with the Burow triangles. Imre, Jr., applied these principles to plastic repair of various defects of the lids. He uses a more deeply curved incision, undermining of the skin on the side opposite that of the flap, his modification of the Burow triangle, and oblique sutures. The author commends this method. (Illustrated.) J. Hewitt Judd.

Löwenstein, A. **Covering of congenital and acquired defects of the lid margin by auricular cartilage.** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 320. (Ill.)

A triangular piece cut from the margin of the auricle is implanted into the coloboma and fixed by mattress sutures.
C. Zimmermann.

Marsigli, C. **Aspects and direction of the nasolacrimal canal and development of paranasal cavities.** Riv. Oto-Neuro-Oft., 1934, v. 11, May-June, pp. 299-319.

From a study of nineteen radiograms of the nasolacrimal canal the writer concludes that if the ethmoid and maxillary sinuses are small the canal is deviated outward, otherwise it is deviated inward, and that if the posterior ethmoid is large the anterior-posterior curvature is well marked. (Bibliography and nine figures.)
M. Lombardo.

Newton, F. H. **Refractive changes in acute chalazia.** Arch. of Ophth., 1934, v. 12, Aug., pp. 238-239.

Three cases are reported in detail to show the rather sudden and extensive changes in refraction found in the presence of acute chalazia of the upper lid. The author believes the changes are due to pressure. J. Hewitt Judd.

Orzalesi, F. **Very good esthetic and functional results after correction of cicatricial ectropion by skin graft.** Boll. d'Ocul., 1933, v. 12, Sept., pp. 906-931.

This method of blepharoplasty was used in the eye department of the University of Florence. To cover the lid wound a flap one-third larger is taken from the skin of the posterior surface of the ear of the patient. Success in this kind of operation depends upon the skin being thin and especially rich in elastic fibers. (Seven figures.)
M. Lombardo.

Sená, J. A. **Autoplastic cutaneous grafts in the treatment of cicatricial ectropion.** La Semana Med., 1934, yr. 41, Aug. 16, pp. 489-498. (See Amer. Jour. Ophth., 1934, v. 17, Dec., p. 1193.)

Zacharov, A. **Late results of the Snellen and Millingen-Sapeshko operations.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 5, p. 491.

From a study of the late results of 293 Snellen and 274 Millinger-Sapeshko operations the author concludes that restoration of the intermarginal space after the Millingen-Sapeshko is more effective in trichiasis and entropion than after the Snellen operation. There was recurrence of entropion and trichiasis after seventy percent of the Snellen operations. A combination of the two procedures gives the best result. Corneal complications occur in both operations, but 7.6 percent more frequently after the Snellen operation, although the Snellen operation gives a better cosmetic result and is less irritating. Only mucous membrane should be used for marginoplastic operations.
Ray K. Daily.

15. TUMORS

Bloch, S., and Siobrowski, J. **A case of metastatic carcinoma of the choroid.** Klinika Oczna, 1934, v. 12, pt. 2, p. 278.

A peasant woman of forty-eight years, with a carcinoma of the left breast for two years, suddenly developed cloudiness of vision. Ophthalmoscopic examination showed a carcinomatous focus in the choroid of the right eye, and two foci in the left eye, with involvement of the macula and greatly reduced vision. The patient also had metastatic foci in the left axilla and the head of the left humerus.
Ray K. Daily.

Davies, W. S. **Neoplasms of the lacrimal gland, with a report of two**

cases. Arch. of Ophth., 1934, v. 12, July, pp. 33-37.

The previously reported cases are briefly considered as to pathology, clinical course, and treatment. The author's first case was that of a woman, aged thirty-one years, who had noticed gradual proptosis of the right eye for about four years. A true mixed tumor of the lacrimal gland was entirely removed with complete recovery. The second case was that of a man aged forty-nine years, who had noticed gradual proptosis of the right eye starting one month after an automobile accident one year previously. The presence of syphilis necessitated differentiation of a tumor from a gumma. At operation a diagnosis of adenocarcinoma was made by frozen section and the orbit was exenterated and irradiated.

J. Hewitt Judd.

Giannini, D. **Choroidal endothelioma in a subject of multiple neoplasia.** Ann. di Ottal., 1934, v. 62, Oct., p. 852.

The author describes a rare case of angiomatous endothelioma of the choroid in a subject having other forms of neoplasm (local recurrence of mammary cancer, carcinomatous stenosis of the stomach, multiple metastasis of the liver, of the peritoneum, and of the pleura. (Two descriptive plates, bibliography.) Park Lewis.

Gow, W. H. **Report of an unusual case of orbital tumor.** Brit. Jour. Ophth., 1934, v. 18, Sept., p. 520.

A girl aged eighteen years presented a huge tumor of the left orbit. At thirteen years she had noticed the eye moderately larger than its fellow and blind. Exenteration was performed easily. The ovoid growth, 21 by 18.8 cm., was a cyst containing a thick brownish fluid. Microscopic examination showed it to be a dermoid. (Seven illustrations.)

D. F. Harbridge.

Griffith, Arthur. **Report on a case of glioma retinae treated by surface applications of radium, with pathological findings.** Trans. Ophth. Soc. United Kingdom, 1933, v. 53, p. 238.

The author reports glioma of the retina in both eyes of a child one year and nine weeks old, in a family in which three out of five children had retinal glioma. The father had had an eye removed for glioma at the age of two years and three months. The patient's right eye had been removed at the age of nine weeks, and one year later the diagnosis was made in the left eye. The left eye was treated with radium four different times. The tumor almost entirely disappeared, then reappeared in a different part of the retina, and radium treatment was delayed. The tumor became smaller for a while, then began to enlarge, and the child died at the age of three and one-half years from intracranial extension.

Beulah Cushman.

Grolman, G. **Treatment of malignant growths of the anterior segment by combined diathermocoagulation and radium.** Arch. de Oft. de Buenos Aires, 1934, v. 9, April, p. 124.

The use of diathermocoagulation and radium is advocated because, among other advantages, the destruction is more thorough, the operation may easily be repeated when necessary, and the scars are inconspicuous. It is pointed out however that cicatrization is much slower than is currently admitted and that the scars are retractile. The latter point is to be considered in plastic work. The technic is briefly outlined, and a case of epithelioma of the conjunctiva operated on is described and illustrated.

M. Davidson.

McDannald, C. E., and Payne, B. E. **Metastatic carcinoma of the optic nerve and choroid.** Arch. of Ophth., 1934, v. 12, July, pp. 86-92.

This rare condition was found in a woman aged forty-two years, who had severe pain in the right eye, blindness of two months duration, and ptosis of the right upper lid for three weeks. The eye deviated upward and outward, and the pupil was dilated and fixed. A radical mastectomy had been done ten months earlier for carcinoma. Examination of the fundus showed a slightly

elevated oval mass which extended from two disc diameters temporally over on to the disc. There were irregular shallow depressions on its surface. Enucleation was performed for relief of pain. Death ensued six months later. The pathologic findings are described and are illustrated by photomicrographs. J. Hewitt Judd.

Moore, R. F. **The value and technique of the use of radon in certain intraocular conditions.** Trans. Ophth. Soc. United Kingdom, 1933, v. 53, p. 215.

The use of radon seeds is advised if enucleation is refused in an only eye affected with sarcoma or glioma. The author reports on its use in interstitial and scleral applications. He found that seeds of considerable strength might be used without producing dangerous sloughing of tissue, and that sarcoma and glioma would disappear under their influence and were perhaps curable. Scarring of the choroid and retina could be effected, so as to obliterate blood vessels completely, and so prevent progress of the disease. Beulah Cushman.

Papolczy, Franz. **Disseminated sarcoma of the iris in the anterior chamber after traumatic uveitis.** Klin. M. f. Augenh., 1934, v. 93, Aug., p. 189. (Ill.)

A woman of sixty-four years sustained six years ago an injury of her left eye by the branch of a tree, followed for months by severe inflammation with impairment of sight. In the last few months she had constant pain and lost vision entirely from plastic uveitis and absolute secondary glaucoma, necessitating enucleation. The cornea was very opaque and there was exudate in the anterior chamber. Clinically the disseminated sarcoma of the iris found upon histologic examination had not been diagnosable. The adequacy of total extirpation by iridectomy must be very much doubted. The author proved histologically in a former publication that after extirpation with iridectomy a mass of tumor cells may remain in the sinus of the anterior chamber and in the ciliary body. If doubt can be excluded the eye with sarcoma of the iris must be enucleated as early as possible. C. Zimmermann.

Samuels, B. **Anatomic and clinical manifestations of necrosis in eighty-four cases of choroidal sarcoma.** Arch. of Ophth., 1934, v. 11, June, pp. 998-1027.

An anatomic study of eighty-four globes, each containing a necrotic sarcoma, revealed that no tissue within the globe escapes damage from the toxins generated in the necrotic tumor cells. In this series sixty tumors were partially and twenty-four completely necrotic. There were fifty-eight recent cases (without membranes) and twenty-six old cases (with membranes). The effects of the toxins on the individual parts of the eye are summarized for each group and the clinical signs and symptoms are explained by the pathological changes. Sympathetic ophthalmia occurred in only one indisputable case. (Photomicrographs.)
J. Hewitt Judd.

Schmidt, Rolf. **Isolated melanosis of the cornea eight years after excision of a superficial limbal melanosarcoma.** Klin. M. f. Augenh., 1934, v. 93, Aug., p. 164. (Ill.)

A man, aged fifty-nine years, presented isolated infiltration of the anterior half of the cornea, especially in the parenchymatous strata, with cells of a limbal melanosarcoma which had been excised eight years previously without clinically and histologically noticeable relapse. One must assume that at the extirpation of the original tumor a few remnants were left in the deeper conjunctival layers, or that upon conjunctival covering of the defect they were transplanted into the marginal parts of the corneal lamellae, whence they were slowly propagated into the adjacent lamellae. C. Zimmermann.

Shumway, E. A. **Nonpigmented nevus of the lacrimal caruncle.** Amer. Jour. Ophth., 1934, v. 17, Nov., pp. 1055-1057.

Vogt, A. **Rare mulberry tumor of the retina with tuberous sclerosis of the**

brain, followed for nine years. Zeit. f. Augenh., 1934, v. 84, Aug., p. 18.

A mulberry-like tumor not much greater in diameter than the optic disc is beautifully shown on a colored plate. It hardly changed during nine years of observation. Tuberous cerebral sclerosis has been known since 1880 and is characterized by the early development of glial tumors of the cerebral cortex which may project into the ventricle, associated with numerous independent tumors elsewhere in the body (for instance, rhabdomyoma in the heart, Grawitz tumors in the kidney). Van der Hoeve first described the complicating eye tumor in 1921. Usually the patient is epileptic and has progressive dementia. Heredity has been demonstrated.

F. H. Haessler.

Weskamp, Charles. **Meningioblastoma of the small wing of the sphenoid.** Ann. d'Ocul., 1934, v. 171, July, pp. 579-587.

There are three points of ophthalmologic interest in this report: (1) exophthalmos, (2) optic atrophy, and (3) x-ray changes at the apex of the orbit. The patient was a man aged fifty-three years who had a very noticeable exophthalmos of the left eye, dating back several years. Blindness developed gradually and was absolute before the examination. The tumor was removed by operation. F. Rommel Hildreth.

16. INJURIES

Amsler, Marc. **Traumatic changes in the retinal vessels.** Ann. d'Ocul., 1934, v. 171, July, pp. 568-579.

This rare affection was first described in 1910 by Purtscher. The present report of five cases brings the total in the literature to 30 cases (38 eyes). All reports are of clinical studies, there being no example of the pathological anatomy. The ophthalmoscopic picture is dominated by characteristic white retinal patches in the posterior pole, resembling snow patches or cumulus clouds, up to a half disc-diameter in size, multiple, isolated or confluent, usually along the course of a vein, and just beneath the nerve fiber layer of the retina. The injury may be direct to the eye, but is commonly from a skull injury or a blow on the thorax.

H. Rommel Hildreth.

Bedell, A. J. **Some remarks regarding traumatic cataract.** Trans. Amer. Acad. Ophth. and Otolaryng., 1933, 38th annual meeting, p. 81.

The ophthalmologist must rely mainly upon clinical findings in making a diagnosis of traumatic cataract. Slit-lamp examination is absolutely necessary in thorough study of the lens. Congenital anomalies, developmental changes, and traumatic effects must be differentiated. Leaf-shaped cataract is as yet an unsolved problem. (Sixteen figures, discussion.)

George H. Stine.

Benstein, I. **Avulsion of the globe and optic nerve.** Sovietskii Viestnik Opht., 1934, v. 5, pt. 1, p. 56.

A man was struck by an automobile and the result was avulsion of the left eyeball. The conjunctiva was torn at the limbus, the recti muscles were separated from the sclera, and the nerve was torn at the apex of the orbit. The vision of the other eye was unaffected.

Ray K. Daily.

Berezovskaja, B. **Scleral rupture with subconjunctival luxation of the lens.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 5, p. 508.

A young woman was struck in the left eye by a cow's horn, with resulting scleral rupture and subconjunctival luxation of the lens up and in. The lens was removed sixteen days after the injury and the final vision was 0.6. In such a case it is best to remove the lens after the scleral wound has healed.

Ray K. Daily.

Bolotte, M. **Traumatic myopia.** Arch. d'Opht., 1934, v. 51, Oct., p. 662.

After a contusion in the region of the right eye, a soldier developed myopia of 1.25 D. which disappeared after about one month. This and other cases of traumatic myopia are cited to support the view of Hudelo that the two portions

of the ciliary muscle act as antagonists with separate innervation in accommodation. Thus the traumatic myopia would be explained by paralysis of the radial or tensor portion of the muscle.

M. F. Weymann.

Busacca, A. **Traumatic syndrome of the orbital apex.** Rassegna Ital. d'Ottal., 1934, v. 3, May-June, p. 422.

A sixty-year-old woman suffered a violent blow to the left side of the head when thrown from a cart. There was fracture of the outer wall of the orbit and at the sphenoidal fissure, resulting in retrobulbar hemorrhage, paralysis of the third, fourth, and the ophthalmic branch of the fifth nerves at the level of the fissure. The sphincter pupillae and the ciliary muscle were also affected. Finally chronic glaucoma appeared, which is attributed to altered nervous and circulatory function with impaired drainage of aqueous. Exophthalmos, present at first, improved considerably. Eugene M. Blake.

Chayoutin, C. **Experimental studies on the effect of electric light on the eyes of rabbits.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 5, p. 477.

For a period of twelve to twenty months the eyes of rabbits were exposed for six to eight hours daily to an electric globe of 4,000 candle power and 1 to 2.5 m.k. of heat. The eyes were examined every six days. The first changes consisted in the appearance of vacuoles and dotlike opacities in the region of the posterior star and in some cases also in the region of the anterior star. Opacities appeared also in all the layers of the lens, but were most marked in its central and posterior layers. The fundus changes differed with the pigmentation of the eye. In albinos there was vascular hyperemia with small hemorrhages along the blood vessels. In rabbits with pigmented fundi there were areas of retinal edema and chorioretinitis. Ray K. Daily.

Fledelius, Mogens. **Concerning hemianopsia of traumatic origin.** Arch. d'Opht., 1934, v. 51, Sept., p. 561.

This discussion primarily concerns itself with supporting the views of Coppez concerning the traumatic causation of hemianopic defects in the visual field by tears produced in the chiasm. Four case reports are given, in one of which the industrial compensation angle of the injury played a prominent part.

M. F. Weymann.

Grandi, G. **Considerations on a case of orbital foreign body.** Boll. d'Ocul., 1933, v. 12, Sept., pp. 932-941.

Ten days after an accident, a girl fifteen months old showed an open discharging wound on the left upper lid. Upon exploration a hard object was felt two centimeters from the skin toward the roof of the orbit. It was extracted and was found to be a piece of wood 16 by 6 mm. Complete recovery followed. In doubtful cases, if a bony lesion can be excluded, a discharging penetrating wound of the orbit favors suspicion that it contains a foreign body, notwithstanding a negative x-ray. (Bibliography.) M. Lombardo.

Harbridge, D. F. **Orbital foreign body.** Amer. Jour. Ophth., 1934, v. 17, Oct., pp. 953-955.

Kaelin-Sulzer, Marguerite. **Technical improvement of Vogt's skeleton-free roentgenography of the eyeball; creation of exophthalmos.** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 359. (Ill.)

The disadvantage of the original method was that only the foremost ocular segment was accessible, a smaller area in deep seated than in prominent eyes. Three c.c. of a one percent novocain solution was injected temporally behind the globe, creating exophthalmos of several millimeters. In one case the roentgen picture revealed a second intraocular foreign body similar in size to one detected at the exposure previous to the injection. Of some importance is the fact that the motility of the eyeball during the exposure is very much lowered by absence of pain and decrease of muscular action.

C. Zimmermann.

Kaplan, Y. **Keratoconjunctivitis among spinners of artificial silk.** Sovietskii Viestnik Opht., 1934, v. 5, pt. 1, p. 15.

Ocular affections of spinners of artificial silk take the form of keratoconjunctivitis, and cocaine should not be used to relieve pain because of its deleterious effect on the corneal epithelium. Local prophylaxis is impractical, because an ointment protecting the cornea interferes with vision.

Ray K. Daily.

Marin Amat, M. **Foreign body in the vitreous. The danger of removal by the anterior route.** Ann. d'Ocul., 1934, v. 171, Aug., pp. 661-671.

A foreign body was brought forward from the vitreous around the lens into the anterior chamber and removed through a paracentesis incision at the lower limbus. This was done forty-five days after the accident. The eye was removed soon after because of the severe reaction. A dense scar-tissue mass was found in the vitreous. The lens became opaque immediately after the operation and the author recommends that such an extraction be made direct through the sclera rather than by the anterior route.

H. Rommel Hildreth.

Natanson, D. **Removal of magnetic foreign bodies from the posterior segment of the eyeball.** Sovietskii Viestnik Opht., 1934, v. 5, pt. 1, p. 41.

The author stresses the importance of accurate localization and determination of size. If the lens is opaque the foreign body is removed through the anterior chamber, otherwise it is extracted through a scleral incision as close as possible to its location. A fine non-irritating particle imbedded in the one remaining eye with good vision may be kept under observation. In all other cases removal should be prompt.

Ray K. Daily.

Néchitch, G. **A new giant electric magnet with truncated core.** Ann. d'Ocul., 1934, v. 171, July, pp. 545-568, and Aug., pp. 676-701.

This very large and powerful magnet is described according to its electromagnetic dimensions. The unwieldy instrument is rendered useful by detachable flexible leads with suitable tips.

H. Rommel Hildreth.

Ohm, J. **Optokinetic nystagmus in "septojod" injury to the retina.** Zeit. f. Augenh., 1934, v. 83, July, p. 338.

"Septojod" is used in infectious diseases and to obliterate varicose veins. In a woman of thirty years in whom a week's blindness began less than two days after intravenous injection of 150 c. c. of "septojod", vision returned to 3/3 in one month. In the macula and in a somewhat more peripheral band, the retina was yellowish and mottled and had countless small pigment masses in its anterior layers. The picture suggested retinitis pigmentosa, but there was no hemeralopia, contraction of the field, or optic nerve atrophy. By means of graphic records of optokinetic nystagmus, Ohm was able to estimate the visual functions independently of the patient's statements. By suddenly placing a small bright object subtending a visual angle of 1.75 minutes before the rotating drum, one can demonstrate the presence of adequate central vision, because the optokinetic nystagmus is arrested only when the power of fixation is active.

F. H. Haessler.

Rinaldi, S. **The effect of modification of the sexual glands on septic wounds of the cornea.** Ann. di Ottal., 1934, v. 62, Aug., p. 625.

Having removed the sexual glands from animals of both sexes and of different ages, the author wounded the cornea and infected it with staphylococcus pyogenes aureus. The removal of the glands had no apparent result on the progress of the infection. But injection of an extract of the genital glands seemed to have the power of modifying or at least reducing the severity of the infection. (Bibliography.)

Park Lewis.

Schläpfer, H. **Clinical and experimental observations on radiation cataract.**

Deut. med. Woch., 1934, no. 29, July, p. 1101.

The author reviews briefly recent work on cataract occurring in glass-blowers, blacksmiths, molten-steel pourers, and furnace tenders. He reviews the work done at the Vogt clinic on the production of cataract by exposure to radiant energy. He warns that in cases treated by roentgen therapy in the facial region cataract may develop in from two to five months after the last exposure. Where there are other therapeutic measures than x-ray for these cases, the latter should not be employed. Blepharitis is an example of this class. Incipient lens opacities may progress in consequence of exposure to roentgen rays. T. M. Shapira.

Skapska, A. **Ocular injuries inflicted by a cow's horn.** Klinika Oczna, 1934, v. 12, pt. 2, p. 297.

The author reports the final results of thirty-three cases. Only five patients recovered without serious damage to the eye. She pleads for an educational campaign teaching the peasants the gravity of these injuries, and a search for some prophylactic measure, the simplest of which would be amputation of the horns. Ray K. Daily.

Vogt, A. **Concerning skeleton-free roentgen pictures of the eyes.** Deut. med. Woch., 1934, no. 29, July, p. 1104.

Shadows of the soft parts and especially of the skeleton often prevent small foreign bodies in the anterior segment being shown on x-ray films. The author therefore places in the temporal angle of the conjunctival sac a dental film whose corners are attached to a bent lead spoon, the eye being directed nasally; and in a similar way films are placed in the other three angles of the conjunctival sac, exposures being taken separately. In this manner he has been able to find small splinters of iron, copper, glass, and stone. Localization has been further aided by inserting small pieces of metal in the conjunctiva at about the place of perforation and then x-raying with the same small dental film. Recently the author has been able to obtain better pictures by making a retrobulbar injection of 3 to 4 c. c. of novocaine which produces slight exophthalmos and so allows more of the eyeball to be exposed skeleton-free, as well as keeping the eye quiet.

T. M. Shapira.

Wolfson, Z. **The etiology of occupational eye diseases among workers in artificial silk factories.** Sovietskii Viestnik Opht., 1934, v. 5, pt. 1, p. 3.

Spinners in the manufacture of artificial silk are subject to a keratoconjunctivitis caused by the action of carbon disulphide, sulphuretted hydrogen, and sulphur dioxide. The hydrogen sulphide injures the corneal epithelium, which becomes raised in the form of blisters. The blisters rupture and expose the corneal nerves to the irritating action of carbon disulphide, and the eye is also exposed to the gas and droplets of sulphurous acid. The author recommends protective glasses, special ventilation, and the construction of special covers for the vats. Ray K. Daily.

17. SYSTEMIC DISEASES AND PARASITES

Aubineau, E. **The clinical value of the Carabelli-Sabouraud tubercle in ocular hereditary syphilis.** Ann. d'Ocul., 1934, v. 171, Aug., pp. 671-675.

Of 2,600 children aged eight to thirteen years, ninety-one presented this dental anomaly. Seventy-three of these cases showed distinctive eye pathology, many of the conditions being specifically syphilitic. It is concluded that this dental abnormality is pathognomonic of hereditary syphilis.

H. Rommel Hildreth.

Ennema, M. C. **Ophthalmomyiasis subretinalis.** Arch. of Ophth., 1934, v. 12, Aug., pp. 180-187.

The left eye of a boy, aged three years, was removed because of a diagnosis of pseudoglioma or glioma of the retina. Histologic examination revealed extensive inflammation accompanied by cellular exudation, chiefly eosinophilic. In the subretinal space was found a segment of a larva of Diptera. The cases

previously reported are reviewed and the close relationship between ophthalmomyiasis externa and interna is pointed out. The internal form is found only under the age of ten years, probably because the harder, thicker sclera of the adult offers too much resistance to penetration by the larva. (Illustrated.) J. Hewitt Judd.

Fenton, R. A. **Naso-ciliary neuralgia from pressure of osteoma.** Trans. Pacific Coast Oto-Ophth. Soc., 1933, 21st annual meeting, p. 90.

A case of osteoma in the right anterior ethmoid region associated with severe headaches, muscular imbalance, dizziness and marked psychic changes, is reported. At operation the osteoma was found to lie across some filaments of the anterior ethmoid nerve. Immediate disappearance of symptoms followed removal of the tumor.
Edna M. Reynolds.

Finnoff, W. C., and Reynolds, E. M. **Clinical and experimental studies of the spread of tuberculosis in the eye.** Trans. Amer. Acad. Ophth. and Otolaryng., 1933, 38th annual meeting, p. 152.

It is the authors' impression that when tuberculosis begins in the ciliary body it spreads to other parts of the eye by way of the ocular fluids in the direction in which these flow. They are in accord with the theory that retinal periphlebitis gives clinical evidence of a backward migration from a hidden tubercle in the ciliary body, and that dissemination occurs by local reinfection along the retinal veins via the perivascular spaces. (Case reports, nine figures, discussion.) George H. Stine.

Heine, L. **The curability of tuberculosis of the uvea, retina, and pons.** Zeit. f. Tuberkulose, 1934, v. 69, no. 6, p. 401.

In twenty-five years the author saw 363 cases of tuberculous iritis, one in every seven of which showed some permanent visual damage.

In 160 private cases of tuberculous choroiditis also, there was permanent visual damage in one out of every seven. In twenty-five years at the Kiel clinic the author saw twenty cases of solitary tubercle, none of which caused the death of the patient. In solitary tubercle of the retina, says the author, we are really dealing with the brain, and more especially with the pons. Characteristic ocular symptoms of pontine involvement are: (1) abducens paresis, (2) abducens paresis with facial paresis, (3) abducens paresis with paresis of the internal rectus of the opposite side, (4) limitation of lateral motion, (5) weakness of elevation, especially bilateral, (6) weakness of depression, especially bilateral, (7) weakness of accommodation. Heine presents twenty-six cases with typical pontine symptoms, over one-half of which were due to tuberculosis. T. M. Shapira.

Jones, O. W., Jr., and Naffziger, H. C. **The clinical characteristics of the ocular myopathies seen in thyroid disorders.** Trans. Pacific Coast Oto-Ophth. Soc., 1933, 21st annual meeting, p. 60.

Seven cases of papilledema with progressive exophthalmos after thyroidectomy are reported in which operation revealed marked increase in size of the extraocular muscles. A case of myasthenia gravis with proptosis and a similar increase in the size of the muscles is also reported, and mention is made of the fact that in syphilis and tuberculosis an increase in the size of the extraocular muscles has been noted.
Edna M. Reynolds.

Kravkov, S. W., and Semenovskaja, E. N. **The effect of prolonged hunger on vision.** Graefe's Arch., 1934, v. 132, p. 370.

Hunger causes sharp diminution of sensitiveness to light, the cause of which lies in injury to the peripheral process of regeneration of the visual purple. H. D. Lamb.

Lavin, L. H. **Relationship between certain cases of herpes ophthalmicus and varicella.** Trans. Ophth. Soc. United Kingdom, 1933, v. 53, p. 271.

The author reports six cases of herpes zoster ophthalmicus after contact with patients who had chicken pox (vari-

cella) or developed chicken pox in a few days. He concludes that the relationship of epidemic herpes zoster and varicella may be explained on the hypothesis that both these diseases are modified strains of the same parent virus, having somewhat the same relationship to each other as the viruses of small pox and vaccinia. Beulah Cushman.

Marinus, C. J. **Relation of endocrines to eye, ear, nose, and throat disease.** Trans. Amer. Acad. Ophth. and Otolaryng., 1933, 38th annual meeting, p. 238.

The clinical entity of hypogonadism or deficiency of the internal secretion of the gonad is defined and described. It is shown that the vasomotor instability long known to be associated with ovarian disorders is part of a widespread vegetative instability of the nervous system accompanied by a characteristic similar emotional disturbance. Variation in symptomatology in accordance with the menstrual cycle is shown to be a valuable diagnostic criterion. The principles of treatment and prognosis are described. (Case reports, discussion.) George H. Stine

Motegi, A., and Sgu, S. **Ophthalmologic observations in 101 cases of chronic opium intoxication.** Klin. M. f. Augenh., 1934, v. 93, Sept., p. 367.

The eyes of these addicts were examined before beginning treatment, immediately after recovery (requiring about one month), and from one to two weeks later. From the presence of miosis, enophthalmos, diminished tension, and narrowing of the palpebral fissure, the authors attribute the chronic opium intoxication to disturbance of the sympathetic nervous system. Impairment of vision in consequence of chronic opium intoxication could not be observed. In 42.11 percent of the cases anemia of the optic nerve was relieved. It was due to the blood condition and not to anatomic changes in the nerve.

C. Zimmermann.

Movshovich, A. **Difficulty in diagnosis of subconjunctival cysticercus.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 5, p. 570.

An apparently benign conjunctival cyst was removed from a man of twenty-nine years. Histologic examination showed that it contained a cysticercus. Ray K. Daily.

Passow, A. **Concerning ocular paresis and status dysgraphicus, and the etiology of Horner's syndrome and heterochromia.** Münch. med. Woch., 1934, v. 81, Aug. 10, pp. 1243-1249.

In ninety-five patients with Horner's syndrome, heterochromia or congenital paresis of trigeminus, abducens, or facial nerve—a symptom of the status dysgraphicus—was found, indicating the same etiology for these eye findings as for the status dysgraphicus and syringomyelia, namely a disturbance in the development of the spine.

Bertha Klien Moncreiff.

Povolodskii, B. M. **Trichinosis as an etiologic factor in optic neuritis.** Sovietskii Viestnik Opht., 1934, v. 4, pt. 5, p. 476.

Bilateral optic neuritis complicated trichinosis in a man of forty-three years. Central vision was lowered, and there was contraction of the temporal fields.

Ray K. Daily.

Urbanek, J. **Allergic diseases of the eye.** Wien. med. Woch., 1934, no. 26, pp. 707-711; no. 27, pp. 743-746; and no. 28, pp. 772-774.

In these three articles the author shows that there is a definite connection between various forms of ocular tuberculosis, for example tuberculous uveitis and scrofulous keratoconjunctivitis, and tuberculous allergy and anaphylaxis. The presence of tubercle bacilli is insufficient to produce a reaction in an eye but a second component, known as the tuberculous anaphylactic component, must be present. Urbanek cites several cases to prove his assumption. In his own work he uses tebeprotein exclusively. He also reports that in many cases tubercle bacilli were found in the blood by the Loewenstein

method, after clinical examination and x-rays had proved absolutely negative.
T. M. Shapira.

Vail, H. H. **Syndrome of pain in its reference to the eye, ear, nose, and throat.** Trans. Amer. Acad. Ophth. and Otolaryng., 1933, 38th annual meeting, p. 255.

The gasserian ganglion and its branches, the sphenopalatine ganglion and its branches, the Vidian nerve, the geniculate ganglion, the tympanic plexus, the glossopharyngeal nerve and its branches, and the great superficial petrosal nerve are subject to irritations and stimulations at any point in their course. With the exception of gasserian-ganglion neuralgia, which has a definite syndrome, there is considerable overlapping between all other reflex neuralgias involving the eye, ear, nose, and throat. For instance, a point of irritation in the geniculate ganglion may manifest itself as a pain in the eye, and irritation in the sphenomaxillary fossa may produce pain in the ear. Points of irritation anywhere along the course of this nervous network show up most frequently in the eye. (Discussion).
George H. Stine.

Zanettin, G. **Focal infections and eye diseases.** Ann. di Ottal., 1934, v. 62, July, p. 589, Aug., p. 695, and Sept., p. 786.

Zanettin marvels that the remarkable reports of focal infections coming from the Mayo Clinic with its wealth of material have not attracted wider European consideration. The subject was presented for consideration at the meeting of the German Ophthalmological Society at Wiesbaden by Rosenow and Pässler in 1930 and at the recent meeting of the Italian Society of Internal Medicine by Lusena and Chini. The discussion brought out on those occasions is briefly summarized.

The author describes a series of experiments, using cultures from twenty-five patients with ocular affections probably due to focal infection. The cases studied included acute and chronic uveitis, affections of the optic nerve, keratitis, retrobulbar optic neuritis, and sclerochoroiditis. Of eighty-seven patients having noninfectious ocular diseases such as glaucoma and cataract, sixteen percent were found to have tonsil infection. Of twenty-six specially studied fifty-seven percent showed inflamed tonsils, and in eleven of these latter the germs were oculophilic, while of the twenty-six patients sixteen were demonstrated to have oculotropic organisms, nine from the tonsils, three from the teeth, two from the cervix of the uterus, and two from other foci. Of sixteen cases in which the uvea was affected sixty-eight percent originated in the tonsils. Of five cases affecting the cornea and sclera one originated in the teeth and two in the uterine cervix. Of five cases affecting the optic nerve three were positive, two from the tonsils and one from the tonsils and the uterine cervix. (Three plates, bibliography.)
Park Lewis.

18. HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Heine, L. **Can one see sound and hear light?** Zeit. f. Augenh., 1934, v. 84, Aug., p. 73.

Heine reviews the history of angelology and angelolatry, which he fancifully associates with the modern science of rhythmic waves in acoustics and electricity. If one views the groove traversed by a phonograph needle with a magnification of 500 to 1000 diameters, one gets a picture like an airplane photograph of a rectilinear mountain valley. The vibrations induced when the needle traverses this valley can produce five to ten thousand tones and overtones simultaneously, and, in the phraesology of the medieval church father, an infinite number of such angels "may dance on a needle point."
F. H. Haessler.

Laughlin, R. C. **Glaucoma, a historical essay.** Bull. Johns Hopkins Hosp., 1934, v. 54, May, p. 141.

The writings of forty-two authors from the time of Hippocrates to the present are reviewed, and the gradual development of our understanding of glaucoma is traced from the ancient writers who were unsuccessful in dis-

tinguishing it from cataract to the modern writers with their various types of operation for its relief.

Edna M. Reynolds.

Lebensohn, J. E. **1934—The semicentenary of local anesthesia.** Amer. Jour. Ophth., 1934, v. 17, Oct., pp. 949-952.

Patterson, R. U. **Progress in ophthalmology in the military service since Civil War times.** Trans. Amer. Acad. Ophth. and Otolaryng., 1933, 38th annual meeting, p. 28.

This interesting history of ophthalmology since Civil War times does not lend itself to abstraction.

George H. Stine.

Reis, W. **A heretofore unknown manuscript dating from the fourteenth century on the subject of glasses.** Klinika Oczna, 1934, v. 12, pt. 2, p. 303.

The author calls attention to a manuscript in the National Library in Paris, written by Jean Brisebarré in 1327, urging the Jews to accept Christianity. The writer of the manuscript tells the Jews to use "glasses" to relieve their religious blindness. From this the author believes that glasses must have been well known at that time. Ray K. Daily.

Schmeichler, Ludwig. **The question of obligatory operations after compensable injury.** Zeit. f. Augenh., 1934, v. 84, Aug., p. 34.

The author expresses doubt as to the expediency and justice of making compensation depend on the patient's acceptance of a surgical procedure. He gives numerous examples from his practice to oppose the position taken by Waetzold, who advocated obligatory surgery in an essay in the same journal, 1933, volume 80, seconded by Heine, 1933, volume 82. F. H. Haessler.

Terson, A. **First notions and interpretations of hypertonus in glaucoma.** Ann. d'Ocul., 1934, v. 171, Aug., pp. 701-708.

This is a most interesting paper on the history of glaucoma and mentions the ideas and contributions of early workers in the field.

R. Rommel Hildreth.

Terson, A. **Historic documents on sclerectomy.** Ann. d'Ocul., 1934, v. 171, Aug., pp. 708-713.

Sclerectomy dates back many years but was not originally used for the cure of glaucoma. F. Lagrange and later Elliot developed and popularized anterior sclerectomy with fistulization for glaucoma. H. Rommel Hildreth.

Tiscornia, A. **Vision in the railway services.** Arch. de Oft. de Buenos Aires, 1934, v. 9, May, p. 192.

More rigorous initial examination of those entering the service is advocated in order to avoid later conflicts arising on reexamination for promotion, for often candidates then have to be rejected for color blindness which could have been discovered earlier. Examination should preferably be by ophthalmologists. The elementary principles of examination of candidates for the transportation services are outlined for the benefit of the general practitioner who may be called upon in lieu of an ophthalmologist. M. Davidson.

Wall, J. J. **Trachoma in the Indians of Western Canada.** Brit. Jour. Ophth., 1934, v. 18, Sept., p. 524.

In Western Canada the Indians who formerly lived largely by hunting and trapping are now engaged in agriculture and stock raising, and so are brought into more intimate contact with the whites. Some infected areas show an incidence of forty to fifty percent. The author believes that the condition was introduced by nomad Mongolians. D. F. Harbridge.

19. ANATOMY AND EMBRYOLOGY

Adelmann, H. B. **The embryological basis of cyclopia.** Amer. Jour. Ophth., 1934, v. 17, Oct., pp. 890-891.

Birch, T. W., and Dann, W. J. **Ascorbic acid in the eye-lens and aqueous humor of the ox.** Biochem. Jour., 1934, v. 28, no. 2, p. 638.

Previous work on the estimation and distribution of ascorbic acid in animal tissues as detected by indophenol titration is briefly reviewed. Ascorbic acid is

found in the lens of the ox to the extent of about two-thirds of the amount suggested by indophenol titration.

Edna M. Reynolds.

Caramazza, F. **The retina and optic nerve in some anencephalic monsters.** Riv. Oto-Neuro-Oft., 1934, v. 11, May-June, pp. 217-235.

Examination of completely and normally developed eyeballs of three such fetuses, one seven months old and two at term, showed a normal retina with well developed nerve fibers in it and in the optic nerve. This demonstrates that the malformation of the cerebral mass had begun after formation of the optic vesicles and, due to the presence of encephalic nerve trunks, after formation of the cerebral vesicle, the full development of the latter having been arrested by pressure from hemorrhage or hydrocephalus, or by a destructive inflammatory process. (Eleven illustrations, bibliography.) M. Lombardo.

Morard. **The reticulo-endothelial system of the eye.** Arch. d'Opht., 1934, v. 51, Sept., p. 582.

This concise article is divided into three parts, first, a review concerning histologic research upon the normal eye; second, a review of histopathologic experimental research; third, a histologic description and classification of the location of the reticulo-endothelial system in the eye.

M. F. Weymann.

Punnet, R. C., Usher, C. H., Van Duyse, Bell, Julia, and Mann, I. C. **Discussion on hereditary eye diseases.** Trans. Ophth. Soc. United Kingdom, 1933, v. 53, pp. 9-57.

Punnett offers a theory for the hereditary defects which do not fall into the classification of Mendelian laws or the sex-linked recessives, as the mating of a normal man and normal woman producing a defective daughter. If one chromosome carries a factor which can neutralize or inhibit the dominant effect of the normal factor in the sex chromosome over the defective one, the result will be apparent dominance of the defective condition.

Usher discusses single-case pedigrees. The view that cases are hereditary in origin may be supported by similarity to undoubtedly inherited cases. Some sibships which were small and incomplete at the time of examination, and contained only a single affected person, would likely show other cases when the sibship was completed.

Van Duyse cites pedigrees which disprove the Mendelian theory as to the transmission of dominant or recessive familial disease. Diseases which are transmitted as sex-linked characters cannot be explained by the Mendelian theory.

Bell reminds the recorder of pedigrees of the importance of always providing sufficient clinical details of cases to enable readers of a future generation to be quite sure of the diagnosis from the facts given, and also of calling attention to any unusual quality in a given pedigree.

Mann discusses the possibility of experimental production of eye defects. Mechanical, thermal, chemical, radiant, electric, and magnetic stimuli have been used to bring about hereditary defects. The author concludes that congenital defects of the eyes may be produced experimentally in one generation by a large variety of chemical and physical means, that hereditary defects frequently arise spontaneously in experimental animals and may be intensified by inbreeding, but that all attempts to produce hereditary eye defects experimentally in mammals have so far failed.

Beulah Cushman.

NEWS ITEMS

News items should be sent to the Editor by the twelfth of the month.

Deaths

Dr. Howard F. Hansell, Philadelphia, aged 78 years, died, Nov. 5th, of heart disease.

Dr. Leroy Thompson, Chicago, aged 51 years, died, Nov. 14th, of carcinoma.

Dr. Victor Ray, Sr., Cincinnati, aged 68 years, died, Oct., 25th, of heart disease.

Dr. George Clyde Kneedler, Pittsburgh, aged 68 years, died, Oct. 12th, of carcinoma.

Miscellaneous

The curriculum for lecture courses for the staff members has been posted at the Brooklyn Eye and Ear Hospital. Whereas these lectures have been going on for a good many years, in the last three or four years a more elaborate curriculum and prepared material has done much to make the work of more value to a greater number of men. These lectures cover approximately 90 hours.

Dedication exercises were held October 8, 1934, at Christian R. Holmes Hospital, Cincinnati, marking the opening of its new ophthalmo-pathologic unit. This unit has been equipped and endowed by Mrs. Christian R. Holmes as a part of the many benefactions which she has given to the College of Medicine, University of Cincinnati.

Speakers on the informal program included Dr. A. C. Bachmeyer, consultant of Holmes Hospital, and Dr. Alfred Friedlander, Dean of the College of Medicine. The dedicatory services were attended by a large group of ophthalmologists, many of whom expressed delight with the new unit and gratification that a type of service hitherto lacking in Cincinnati was now made available.

Mrs. Holmes's gift for equipment was $2,000. She also provided an endowment to produce an annual sum almost equal to her initial gift for its maintenance.

Miss Ellen Buttenwieser will be in charge of the technical work under the immediate supervision of Dr. Mary Knight Asbury, instructor in ophthalmology. Dr. Clarence King, professor of ophthalmology, and Dr. Derrick T. Vail, Jr., instructor in ophthalmology, will act in a consulting capacity.

Thirty ophthalmologists from Boston, Worcester and Providence, R.I., visited the American Optical Company, Nov. 23, 1934, as guests of the Company. The newest developments in refracting instruments and equipment were inspected.

Dr. Julius Neumueller, associated with the optical concern and now doing research work at Dartmouth College, spoke on the subject, "The latest developments in aniseikonia and iseikonic lenses."

Dr. Albert Bielschowsky, of Germany, who is studying at Dartmouth, was the guest speaker.

The Ninth Annual Spring Graduate Course in Ophthalmology and Otolaryngology will be given at the Gill Memorial Eye, Ear, and Throat Hospital from April 15 to April 20, 1935.

The lecturers in Ophthalmology will be Dr. Harry Gradle, Chicago; Dr. Ralph I. Lloyd, Brooklyn; Dr. Ben Witt Key, New York City; Dr. John A. Pilcher, Roanoke, Virginia.

The lecturers in Otolaryngology will be Dr. William V. Mullin, Cleveland; Dr. Oscar V. Batson, Philadelphia; Dr. Lyman Richards, Boston; Dr. John A. Kolmer, Philadelphia, and Dr. E. G. Gill, Roanoke.

Societies

Brooklyn has its own chapter of the American College of Surgeons. This is unique since it is the first chapter of its kind so far organized. The point of interest to the ophthalmologist is that ophthalmologists of the locality are well represented on its committees. It has been so helpful in coordinating the activities of the College, that other communities would do well to investigate its workings with a view to establishing similar chapters for their locality.

The Iowa Academy of Ophthalmology and Otolaryngology met in Iowa City on November 22, 1934. The following officers were elected for the coming year: President, Dr. F. W. Dean, Council Bluffs; Vice-president, Dr. Edwin Cobb, Marshalltown; Secrectary-Treasurer, Dr. O. L. Thornburn, Ames.

Mr. Leslie Paton of London will be the guest speaker before the Section on Ophthalmology at the American Medical Association meeting in Atlantic City in June, 1935.

Personals

Dr. Casey Wood is on his way to Cairo, Egypt, where he will spend some time with his old friend, the celebrated Medical Orientalist, Dr. Max Meyerhoff, in preparing an English Translation of the famous tenth century Arabic treatise—the earliest complete monograph—on the Eye and its Diseases. This Tadkirat or Oculist's Note-Book is extremely rare in its original manuscript form but Dr. Wood has finally succeeded in purchasing one from a Damascus dealer.

The most recent odyssey of the Casey A. Wood family and their proposed itinerary for 1934-1935, is as follows: Dec. 1931, to Dec. 1932, 295 Wigmore Drive, Pasadena, California; Jan. 1933, to Aug. 1933, Queen's

Hotel, Kandy, Ceylon; Sept. and Oct. 1933, motor trip through northern Italy; Oct. 1933, to May 1, 1934, Hotel de Russie, Rome, Italy; May 20, to June 15, 1934, Ritz-Carlton Hotel, Montreal, Canada; July 1, 1934, to Dec. 23, 1934, Athenaeum, Pasadena, California; Dec. 23, 1934, to Feb. 1, 1935, en route Pasadena to Cairo, Egypt, via Panama Canal and New York City; Feb. 1, to March 1, 1935, Shepheard's Hotel, Cairo; March 1, 1935, Hotel de Russie, Rome, Italy.

Dr. Edward Jackson made a fleeting call on Brooklyn on the occasion of his recent visit to New York in connection with the meeting of the National Society for the Prevention of Blindness. His enthusiasm and energy are a marvel to all of us, and it would be nice if he could give a small injection of the same stimulating powers to some of the younger men who are always going to do something.

Dr. H. Gordon Smith, formerly associated with Dr. Hans Barkan, an instructor in ophthalmology at Stanford Medical School, has opened an office for practice limited to the diseases of the eye, in Palo Alto.

Dr. Fred Cordes has been made chairman of the department of ophthalmology at the University of California Medical School, San Francisco.

Dr. Forrest J. Pinkerton announces the removal of his offices to room seven of The Alexander Young Building, Honolulu. Dr. Thomas W. Cowan will be associated with this office.

A dinner was given by the trustees of Johns Hopkins University, Baltimore, in the Welsh Library in honor of Dr. Wm. H. Wilmer on the evening of November 19, 1934.

Those attending from Washington, D.C. were Drs. John W. Burke, L. S. Greene, Benjamin Rones, Wm. Thornwall Davis, William Cabell Moore and William Gerry Morgan.

The Soft-Lite Lens Co. Inc. announced recently that Mr. Elmer Robertson had joined its staff. Mr. Robertson has been Promotional Manager of the San Francisco Chronicle for the past seven years and was formerly associated with the Shuron Optical Co.

Dr. William H. Wilmer was the guest of honor at a dinner given him by the Brooklyn Ophthalmological Society on the 15th of November. Following the dinner, Dr. Wilmer presented the paper of the evening on the subject of "An atlas of the fundus oculi." Discussion was opened by Drs. Henry Mitchell Smith and Robert M. Rogers.

On November 19th, Dr. John N. Evans read a paper on "Transient fluctuation in the scotoma of glaucoma" before the Eye Section of the New York Academy of Medicine. Drs. Conrad Berens and Ralph I. Lloyd opened the formal discussion.

A series of popular lectures on medical subjects is being conducted for the Brooklyn Y.M.C.A. under the auspices of the Medical Society of the County of Kings. Dr. Earle Hallock is delivering those lectures dealing with ophthalmological subjects.

Attention is called to the fact that an effort is being made to organize an Alumni Association of Past Internes of the Brooklyn Eye and Ear Hospital. Will any one interested please send in all possible information about past internes to Dr. John N. Evans, Brooklyn Eye and Ear Hospital, 29 Greene Avenue, Brooklyn, New York.